

Muzeul Județean Mureș



Studii și materiale



Științele Naturii

2014

MARISIA

Studii și materiale

XXXIII–XXXIV

Științele Naturii



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Front cover: *Narcissus poeticus* L. ssp. *radiiflorus* (Salisb.) Baker (photo and design: Mihaela Sămărghițan)

ISSN: 1016-9652

EDITURA MEGA | www.edituramega.ro

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MUZEUL JUDEȚEAN MUREȘ

MARISIA

STUDII ȘI MATERIALE

XXXIII–XXXIV

ȘTIINȚELE NATURII

Târgu-Mureș
2014

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BOTANY

CONTRIBUTIONS TO THE STUDY OF SPONTANEOUS VASCULAR PLANTS FROM „CÂMPIA TRANSILVANIEI” (MUREȘ COUNTY)

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Abstract: The objective of this study is the floristic inventory of the cormophyte flora in the Transylvanian Plain (Mureș county). The Transylvanian Plain is located in the central part of the Transylvanian Basin and covers the three counties: Bistrița Năsăud, Mureș and Cluj. The *Transylvanian Plain*, found in the Mureș county, lies north of the river Mureș. This region consists of hills with an average elevation of 400 m and wide valleys of the tributaries of the river Mureș that cross this plain.

The Transylvanian Plain is characterized by a great diversity of plant taxa, the floristic inventory comprising a total of 717 vascular taxa, including 693 species, 24 subspecies and 2 forms, distributed in 96 families. This robust floristic inventory results from the diversity of land-forms (hills, plains), the various slopes and exposures of the Plain, and its localized region stretching within the middle of the Transylvanian Basin. A list providing each species accompanied by the appropriate ecological, corological, cenological data, as well as information on the inclusion of each plant in different bioform groups, floral elements and the number of chromosomes is included in this report.

Keywords: vascular plants, inventory, Transylvanian Plain, Mureș county

Introduction

The Transylvanian Plain is located in the the central part of the Transylvanian Basin. It has approximately 5,000 square kilometers and lies partly in the three counties: Bistrița Năsăud, Mureș and Cluj.

Even though the Transylvanian Plain name does not correspond fully to its structural elements, plain is used to describe this area because of the climate, human activity, and in particular due to the land use for agriculture. Using the description plain fits with the conventional practice of naming so many villages using the word “câmpie (plain)” (Silivașu de Câmpie, Zau de Câmpie, Sânpetru de Câmpie, Ceuașu de Câmpie etc.)

In Mureș county, the Transylvanian Plain, north of the River Mureș (Fig. 1) is a lowland region consisting of gently rolling hills (average elevation – 400 m), with wide valleys formed by the tributaries of the river Mureș crossing among the hills. The Transylvanian Plain features a gentle slope, which favored the emergence of numerous ponds along major waterways. Despite the number of ponds and lowland features, the Transylvanian Plain was named “plain” because of its appearance. The part of the Transylvanian Plain situated in the Mureș county is called the

Mureș Plain and includes the Hilly Plain Sărmaș (situated almost entirely in the Transylvanian Plain domes) and Mădăraș Hills (located in the eastern section of the Mureș Plain next to the Reghin Hills).



Fig. 1: Transylvanian Plain (Mureș county)

Contrary to its name, the Transylvanian Plain is not geographically a plateau, but rather a collection of hills. Uniform altitudinal landforms, low landform energy, landslides, valleys with radial-excentric character, ponds, and short rivers without terraces, are many features of the Transylvanian Plain. Some notable exceptions are Fizeș, Pârâul de Câmpie, and Comlod streams, which have discontinuous terraces. Agricultural land occupies about 90% of the total area and forests only 9% with significant differences from one place to another.

The studied area overlaps the area of gas domes and the Tortonian-Sarmatian formations composed of marl, clay, sand, volcanic tuffs and conglomerates on the edges.

Transylvanian Plain climate is moderate, with differences between north and south, as well as a number of topoclimates specific to broad valleys areas.

Air temperature shows slight differences between the north and the south part. Because the north part is characterized by higher peaks, the temperature here is about one degree lower than the south, where the annual average is about 8–9 °C.

Rainfall, generally deficient in the Transylvanian Plain, averages in most of the unit values of 500–600 mm / year, and the frequency of precipitations are characteristic to the north-east and west circulation.

As a consequence of the region localization, of the diversity of landform (hills, plains), the various slope exposures and inclinations of them, the Transylvanian Plain is characterized by a great diversity of plant taxa.

Flora and vegetation of the Transylvanian Plain stirred the interest of botanists, so botanical and phytosociological contributions in this area were published over time by: Fuss, M. [10] Prodan, I. [27], Borza, Al. [3, 4], Ghişa, E. [11], Csürös., St., Csürös-Káptalan, M. [7, 8], and more recently by Oroian, S. [17–25, 30], Pitea, E.D. [26] Sămărghişan, M. [24, 30], etc.

Material and methods

The abstract of the vascular flora of the Transylvanian Plain was developed based on researches conducted during 2000–2014, along with bibliographic information. Besides these, we can add the information contained in the Mureş County Museum Herbarium.

The presentation of each species is accompanied by ecological, corological, cenological data, information on the inclusion in different bioform groups, floral elements and the number of chromosomes. Species nomenclature was made according to *Flora Europaea* [38, 39] and I Sârbu I., Ştefan N., Oprea A. [32], in conjunction with the information provided by the *International Code of Botanical Nomenclature*.

In order to conform our contribution to the general biocenological preoccupations, we indicated the modes of pollination and of fruit and seed propagation, which allow a more comprehensive understanding of biocenotical relationships between plant components of ecosystems. Pollination factors and dispersion modes are indicated in the floral summary by Oberdorfer, E. [14] and Soó, R. [24].

Within each family, genera and species are listed in alphabetical order. Synonymies were recorded in brackets after the scientific name of each species.

In determining endangered, rare or vulnerable species, the National Red Lists [5, 9, 13, 15] and the latest version of zoological categories published in the *IUCN Red List Categories* booklet (1994) [12] were consulted.

Results and discussions

The Transylvanian Plain Flora is characterized by a great diversity of plant taxa. The floristic inventory comprises a total of 717 vascular taxa, including 693 species, 24 subspecies and 2 forms, distributed in 96 families (Table 1). The number of species in the Transylvanian Plain determined so far is 20.45% of all known species of our country (3500 species after Flora RPR and RSR). This significant percentage allows us to appreciate that the studied area is a region with a rich and varied flora. Best represented families are: *Asteraceae* (96 taxa), *Fabaceae* (58 taxa), *Lamiaceae* (52 taxa), *Poaceae* (51 taxa), *Ranunculaceae* (31), *Rosaceae* (30 taxa each), *Scrophulariaceae* (29 taxa), *Apiaceae* (28 taxa), *Brassicaceae* (26 taxa) and *Caryophyllaceae* (17 taxa). On the whole, these families form the basic component of the flora epitome of researched area, representing 54.05% of the total species identified.

Table 1 – Families and number of taxa in studied area

FAMILY	No.of TAXA	FAMILY	No.of TAXA
ACERACEAE	5	JUNCACEAE	5
ALISMATACEAE	1	JUNCAGINACEAE	1
ALLIACEAE	5	LAMIACEAE	52
AMARANTHACEAE	1	LEMNACEAE	1
AMARYLLIDACEAE	2	LILIACEAE	21
ANACARDIACEAE	1	LINACEAE	6
APIACEAE	28	LORANTHACEAE	2
APOCYNACEAE	2	LYTHRACEAE	1
ARACEAE	1	MALVACEAE	6
ARALIACEAE	1	MORACEAE	2
ARISTOLOCHIACEAE	2	NAJADACEAE	1
ASCLEPIADACEAE	2	OLEACEAE	3
ASPLENIACEAE	4	ONAGRACEAE	7
ASTERACEAE	96	ORCHIDACEAE	6
Berberidaceae	1	OROBANCHACEAE	2
BETULACEAE	2	OXALIDACEAE	1
BORAGINACEAE	15	PAEONIACEAE	1
BRASSICACEAE	26	PAPAVERACEAE	3
BUTOMACEAE	1	PARNASSIACEAE	1
CAMPANULACEAE	7	PINACEAE	4
CANNABACEAE	1	PLANTAGINACEAE	3
CAPRIFOLIACEAE	5	PLUMBAGINACEAE	1
CARYOPHYLLACEAE	17	POACEAE	51
CELASTRACEAE	2	POLYGALACEAE	3
CHENOPODIACEAE	2	POLYGONACEAE	14
CISTACEAE	1	PORTULACACEAE	1
CONVOLVULACEAE	2	POTAMOGETONACEAE	1
CORNACEAE	2	PRIMULACEAE	7
CORYLACEAE	2	RANUNCULACEAE	31
CRASSULACEAE	1	RHAMNACEAE	3
CUCURBITACEAE	2	ROSACEAE	30
CUSCUTACEAE	2	RUBIACEAE	13
CYPERACEAE	9	RUTACEAE	1
DENNSTAEDTIACEAE	1	SALICACEAE	10
DIPSACACEAE	6	SANTALACEAE	1
ELAEAGNACEAE	1	SCROPHULARIACEAE	29
EQUISETACEAE	3	SIMAROUBACEAE	1
EUPHORBIACEAE	11	SOLANACEAE	6
FABACEAE	58	SPARGANIACEAE	1
FAGACEAE	4	STAPHYLEACEAE	1
FUMARIACEAE	5	THYMELAEACEAE	1
GENTIANACEAE	3	TILIACEAE	3
GERANIACEAE	6	TYPHACEAE	2
GROSSULARIACEAE	1	ULMACEAE	3
HALORAGACEAE	1	URTICACEAE	2
HYPERICACEAE	3	VALERIANACEAE	1
IRIDACEAE	8	VERBENACEAE	1
JUGLANDACEAE	1	VIOLACEAE	7
TOTAL: 717 taxoni			

Analysis of ecological categories in this area highlights the specific ecological ecosystems of the Transylvanian Plain, in the context of complex local pedoclimatic factors. To characterize the flora of this region, five edapho-climatic factors were considered: light (L), temperature (T), humidity (U), soil reaction (R) and the amount of soil mineral nitrogen (N).

Regarding the light factor, one can observe the dominance of light species tolerant to part shade weak support (36.70%) and species that love light and only exceptional and temporary the shade (28.73%).

Assessing flora according to species distribution based on their requirement to the moisture factor, we find that plants that prefer dry soils ($U_3=20.51\%$) and moderate humidity and moisture ($U_5=19.80\%$) comprise the majority. Besides them, there are species with intermediate preferences between these two types ($U_4=23.46\%$), which indicates the presence of many ecotypes with a low moisture regime in the studied area, that favors the development of xerophytic and xeromezophytic grassland types.

According to the temperature factor, the best represented species are the ones common in hillock and hilly areas (39.74%), and therefore, they put their mark on the general character of the flora in this regard, namely a xero-mesothermal flora specific to a transition region from the plains to the hills. Eurithermal species form also a significant proportion (39.32%).

Compared to soil reaction, most species are widespread in neutral soils, from slightly acid to slightly alkaline (42.63%) which indicates the existence of a land without extreme conditions in the studied area, which is quite favorable to plant development. Also significant is the high percentage of eurionic species (42.06%).

Nitrogen is one of the most important plant nutrients. In the studied area, a significant number of plants are spread mainly on soils poor in nitrogen (15.63%) or very poor in nitrogen (13.42%). There is also a high percentage of species which mostly prefer soils rich in nitrogen (10.62%), but the most numerous are the eurinitrophile species (19.03%). (Fig. 2)

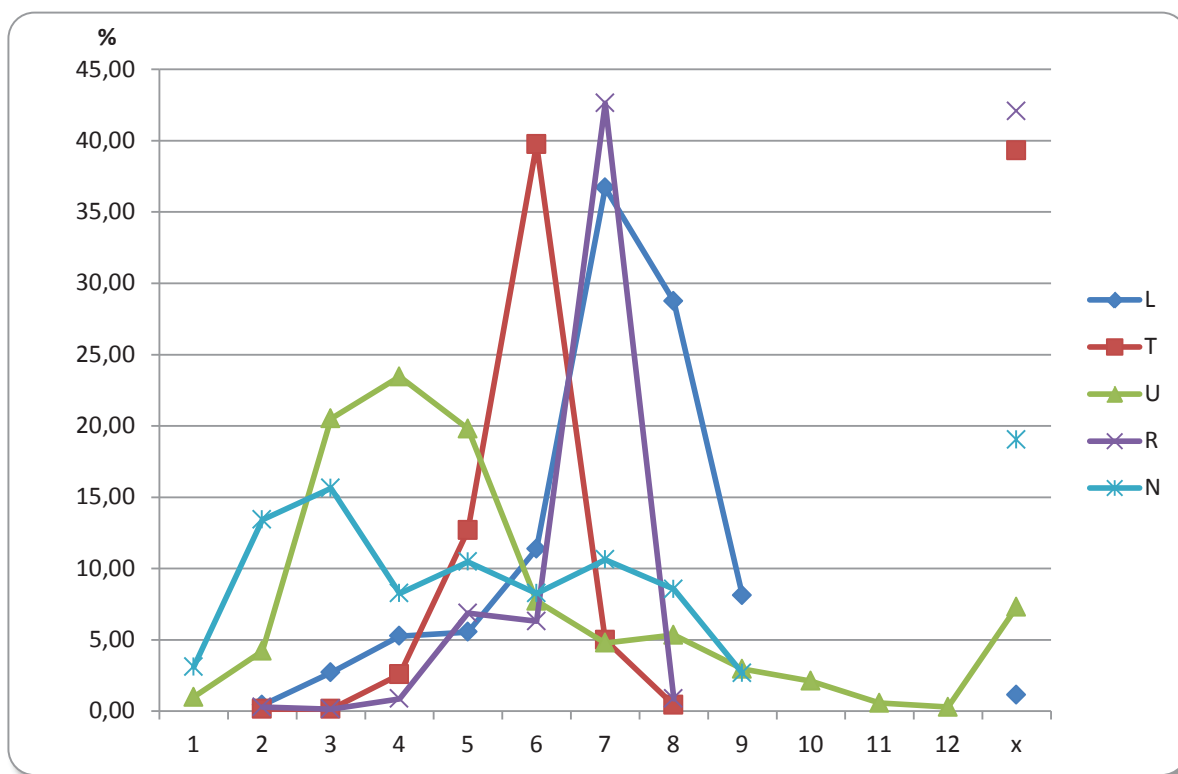


Fig. 2: Ecological indexes of flora in Transylvanian Plain

Knowing the distribution of the bioforms of a region is of particular importance, since it provides paleoecological information on the flora and vegetation of that region, by keeping the meaning of biotope selection in the genre content of bioform categories. (V.Cristea, 1993).

Bioforms spectrum (Fig. 3) points out the high percentage of hemicryptophytes (52.10%) which is closely related to the position of the studied territory and of the large areas consisting of grassland. The presence of a large number of therophyte (21.01%) suggests a climate more or less arid with highly anthropogenic influence and the existence of lands with discontinuous vegetation, with many areas occupied by annual plants. A significant share is held by geophytes (11.20%) represented mainly by species with prevernal and sometimes serotinal anthesis, which is a synecological expression of the phenological rythm, as well as photic regime. Also the phanerophytes are present in a significant percentage (11.06%).

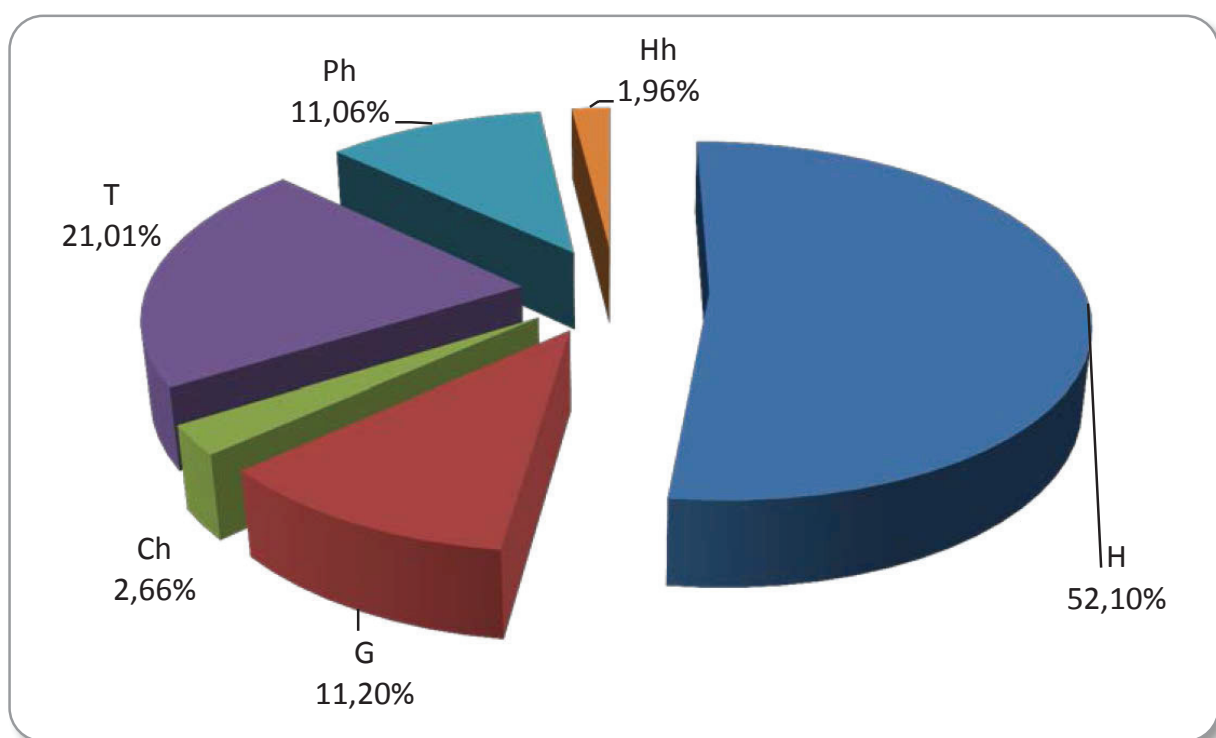


Fig. 3: Bioforms spectrum of flora in Transylvanian Plain

The complex geographical structure of the flora in the investigation area highlights the participation of numerous categories of items with different florogenetic origins, in variable proportions.

The prevalence of Eurasian elements (41.74%) can be easily noticed, with some tendencies towards mainlanders, followed by Europeans (23.53%) and Circumboreals (7.14%).

Due to historical conditions in the post-glacial period, we can also notice the presence of a significant contingent of Mediterranean (2.80%) and Europeo-Mediterranean species (3.78%) in this area.

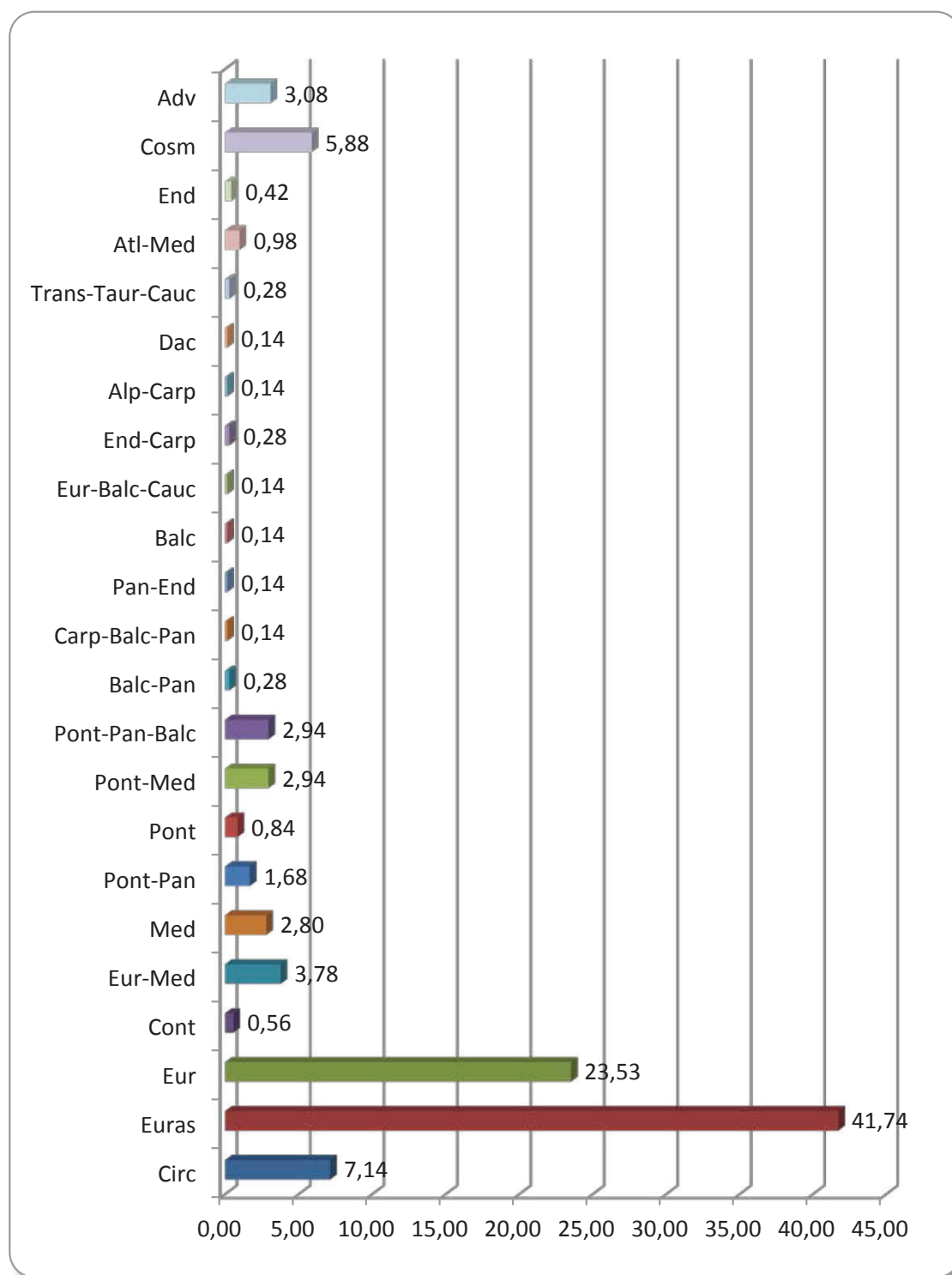


Fig. 4: Floristical elements of flora in Transylvanian Plain

In the karyological spectrum of cormoflora in the Transylvanian Plain (Fig. 5), diploid species are predominant (47.49%) over the polyploid ones (39.80%). Some species are diplo-polyploid (6.84%), and for 42 species (5.87%) we did not have karyological information.

The large number of diploids in this area, which forms the basis of allopolyploid speciation, demonstrates the age of this flora, which provides a favorable genetic potential for future plant evolution. On these old groups, new ones have developed, richer in polyploids, hence their high frequency.

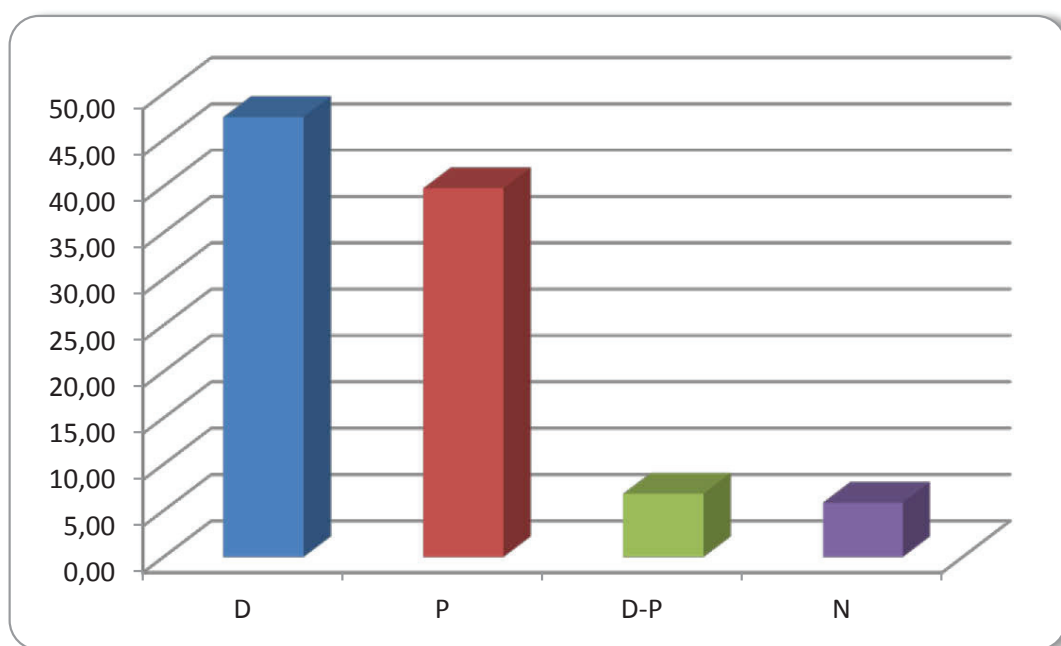


Fig. 5: Cayological spectrum of flora in Transylvanian Plain

A number of species included in national and international red lists were identified in the Transylvanian Plain cormoflora. Of the 717 taxa identified in the Transylvanian Plain flora, 33 belong to different sozological categories (Table 2).

Table 2: Rare, vulnerable, endemic and endangered plants from studied area

TAXON	FAMILY	SOZOLOGICAL CATHEGORY	UICN Category (National Red Lists)
<i>Aconitum lycoctonum</i> L. em. Koelle ssp. <i>moldavicum</i> (Hacq.) J alas	RANUNCULACEAE	NT	End
<i>Adonis vernalis</i> L.	RANUNCULACEAE	NT	V
<i>Adonis volgensis</i> Steven ex DC	RANUNCULACEAE	NT	R
<i>Agrimonia pilosa</i> Ledeb.	ROSACEAE	NT	R
<i>Allium denudatum</i> F. Delaroche (<i>Allium albidum</i> Fischer ex Bieb. ssp. <i>albidum</i>)	ALLIACEAE	NT	R
<i>Astragalus dasyanthus</i> Pallas	FABACEAE	NT	R
<i>Astragalus exscapus</i> L. ssp. <i>transilvanicus</i> (Barth) Jav.	FABACEAE	NT	R
<i>Centaurea trinervia</i> Willd.	ASTERACEAE	NT	R
<i>Cephalaria radiata</i> Gris.	DIPSACACEAE	NT	R
<i>Crambe tataria</i> Sebeok	BRASSICACEAE	VU	VU
<i>Delphinium simonkaianum</i> Pawl.	RANUNCULACEAE	End	R
<i>Dictamnus albus</i> L.	RUTACEAE	VU	VU/R
<i>Epipactis palustris</i> (L.) Crantz	ORCHIDACEAE	NT	R
<i>Fritillaria meleagris</i> L.	LILIACEAE	VU	VU/R
<i>Fritillaria montana</i> Hoppe ex W.D.J. Koch	LILIACEAE	VU	VU
<i>Galanthus nivalis</i> L.	AMARYLLIDACEAE	VU	VU
<i>Gymnadenia conopsea</i> (L.) R. Br.	ORCHIDACEAE	NT	R
<i>Hammarbia paludosa</i> (L.) O. Kuntze	ORCHIDACEAE	VU	E

<i>Hyoscyamus niger</i> L.	SOLANACEAE	NT	R
<i>Inula bifrons</i> L.	ASTERACEAE	NT	R
<i>Iris aphylla</i> L. (<i>Iris hungarica</i> Waldst. et Kit.)	IRIDACEAE	VU	VU
<i>Jurinea mollis</i> (L.) Reichenb. ssp. <i>transylvanica</i> (Spreng.) Nyman	ASTERACEAE	NT	R
<i>Narcissus poeticus</i> L. ssp. <i>radiiflorus</i> (Salisb.) Baker	AMARYLLIDACEAE	VU	VU
<i>Orchis coriophora</i> L.	ORCIDACEAE	NT	R
<i>Orchis morio</i> L.	ORCHIDACEAE	NT	R
<i>Orchis tridentata</i> Scop. ssp. <i>tridentata</i>	ORCHIDACEAE	NT	R
<i>Paeonia tenuifolia</i> L.	PAEONIACEAE	VU	VU
<i>Prunus tenella</i> Batsch.	ROSACEAE	VU	VU
<i>Pulsatilla vulgaris</i> Mill. ssp. <i>grandis</i> (Wender.) Zämel	RANUNCULACEAE	NT	R
<i>Salix rosmarinifolia</i> L.	SALICACEAE	NT	R
<i>Salvia transylvanica</i> (Schur ex Griseb.) Schur	LAMIACEAE	NT	R
<i>Serratula coronata</i> L. (<i>Serratula wolfii</i> Andrae)	ASTERACEAE	NT	R
<i>Serratula radiata</i> (Waldst. & Kit.) Bieb.	ASTERACEAE	NT	R

THE INVENTORY OF SPONTANEOUS VASCULAR PLANTS

SPHENOPSIDA

EQUISETALES

EQUISETACEAE

- 1. *Equisetum arvense* L** – Band, Băla, Câmpenița, Ceuașu de Câmpie, Cozma, Ercea, Fărăgău, Glodeni, Herghelia, Morești, Săbed, Sântana de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni, Zau de Câmpie; *Arrhenaterion*, *Filipendulion*, *Artemisietea*, *Stellarietea mediae*, G, Cosm; 2n=216, P; $L_6T_6U_6R_xN_3$.
- 2. *Equisetum pratense*** – Cozma; *Alnion incanae*; G, Circ; 2n=216, $L_5T_5U_6R_7N_2$.
- 3. *Equisetum telmateia* Ehrh. (*Equisetum maximum* Lam.)** – Fărăgău; *Filipendulion*, *Alnion incanae*; G, Circ; 2n=216, P; $L_5T_7U_8R_8N_5$.

POLYPODIOPSIDA

POLYPODIALES

DENNSTAEDTIACEAE

- 4. *Pteridium aquilinum* (L.) Kuhn** – Herghelia; *Quercetea petraeae*, *Origanetalia*; G, Cosm; 2n=104, P; $L_6T_5U_5R_5N_3$.

ASPLENIACEAE

- 5. *Athyrium filix-femina* (L.) Roth** – Cozma, Ulieș; *Athyrio-Piceetalia*, *Adenostyletalia*, *Fagetalia*, *Alnion incanae*; H, Cosm; 2n=80, P; $L_4T_xU_7R_xN_6$.
- 6. *Dryopteris filix-mas* (L.) Schott** – Herghelia, Săbed; *Fagetalia*, *Quercu-Fagetea*; H, Euras; 2n=164, P; $L_3T_xU_5R_5N_6$.

7. *Gymnocarpium dryopteris* (L.) Newman (*Dryopteris disjuncta* (Rupr.) C. V. Morton) – Herghelia; *Adenostyletalia*, *Piceetalia excelsae*, *Symphyto-Fagion*; G, Circ; 2n=160, P; $L_3T_4U_6R_4N_5$.
8. *Thelypteris palustris* Schott (*Dryopteris thelypteris* (L.) A. Gray) – Fărăgău; *Alnion incanae*, *Magnocaricion elatae*; G, Circ; 2n=70, P; $L_5T_6U_9R_5N_6$.

CONIFEROPSIDA

PINALES

PINACEAE

9. *Larix decidua* Mill. – Cozma; *Piceion excelsae*, *Pinion mugii*; Ph, End. Carp.; 2n=22, 24, D; $L_8T_4U_4R_5N_3$, (planted).
10. *Picea abies* (L.) H. Karst. (*Picea excelsa* (Lam.) Link) – Cozma, Ulieș; *Abieti-Piceion*, *Piceion excelsae*, *Vaccinio-Piceetea*; Ph, Eur (centr. & N); 2n=22, 24, D; $L_7T_4U_5R_4N_x$.
11. *Pinus nigra* J. F. Arnold – Săbed (planted).
12. *Pinus sylvestris* L. – Band, Cozma, Săbed, Târgu-Mureș, Ulieș; *Dicrano-Pinion*, *Betulion pubescentis*, *Quercion petraeae*; Ph, Euras; 2n=24, D; $L_7T_xU_xR_xN_x$; (planted?).

ANGIOSPERMOPHYTINA

Cl. DICOTYLEDONEAE

BERBERIDALES

BERBERIDACEAE

13. *Berberis vulgaris* L. – Band, Șeulia; *Berberidion*; Ph; 2n=28, D; $L_6T_6U_4R_7N_3$.

ARISTOLOCHIALES

ARISTOLOCHIACEAE

14. *Asarum europaeum* L. – Band, Băla, Cozma, Ercea, Herghelia, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Fagetalia*, *Quercio-Fagetea*, H, Euras; 2n=26 (24, 40), D; $L_3T_6U_6R_6N_6$.
15. *Aristolochia clematitidis* L. – Fărăgău, Șeulia, Târgu-Mureș, Săbed, Șăușă; *Galio-Alliarion*, *Alnion incanae*, *Convolvuletalia sepium*, *Artemisietea*, *Stellarietea*; G, Med; 2n=14, D; $L_6T_7U_4R_7N_8$.

RANUNCULALES

RANUNCULACEAE

16. *Aconitum anthora* L. – Bozed, Fărăgău, Săbed; *Seslerietalia*, *Stipo-Festucetalia pallentis*; H, Euras; 2n=32, P; $L_7T_6U_4R_7N_2$.
17. *Aconitum lycoctonum* L. em. Koelle ssp. *moldavicum* (Hacq.) Jalas – Ulieș; *Symphyto-Fagion*; G, End. carp.; 2n=16, D; $L_6T_4U_5R_5N_3$.
18. *Adonis aestivalis* L. – Fărăgău, Herghelia, Lechincioara, Morești, Ulieș; *Caucalidion lappulae*; Th, Euras (cont.); 2n=32, P; $L_6T_6U_3R_7N_3$.
19. *Adonis vernalis* L. – Band, Băla, Fărăgău, Herghelia, Lefaia, Săbed, Lechincioara, Morești, Porumbeni, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festucetalia valesiacae*, *Festuco-Brometea*, *Cirsio-Brachypodium pinnati*; H, Euras (cont.); 2n=16, D; $L_7T_6U_3R_7N_1$.
20. *Adonis vologensis* Steven ex DC. – Zau de Câmpie; *Festucion valesiacae*; H, Cont.; 2n = ...; $L_7T_6U_2R_7N_1$.

21. *Anemone nemorosa* L. ssp. ***nemorosa*** – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Quercus-Fagetalia*, *Fagetalia*; G, Circ; $2n=28-32$, P; $L_3T_5U_5R_5N_x$.
– ssp. ***altaica*** (Fisch. Ex C. A. Mey.) Korsh. – Ulieş; G, Circ; $2n=28-32$, P; $L_3T_5U_5R_5N_x$.
22. *Anemone ranunculoides* L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Quercus-Fagetalia*; G, Eur; $2n=32$, P; $L_3T_6U_6R_7N_8$.
23. *Anemone sylvestris* L. – Fărăgău, Oroiu; *Quercion pubescentis-sessiliflorae*; H, Euras (cont.); $2n=16$; $L_7T_6U_3R_7N_3$.
24. *Caltha palustris* L. – Cozma, Fărăgău, Herghelia, Ulieş; *Calthion palustris*, *Montio-Cardaminetalia*; H, Circ; $2n=32$, P; $L_7T_xU_{10}R_xN_x$; entomophily, hydro-endozoochory.
25. *Clematis integrifolia* L. – Hădăreni, Săbed, Tîrgu-Mureş; *Geranion sanguinei*, *Quercetalia pubescentis*, *Festucion valesiacae*; H, Euras (cont.); $2n=16$, D; $L_8T_6U_3R_7N_3$.
26. *Clematis recta* L. – Băla, Ercea, Herghelia, Săbed, Tîrgu-Mureş; *Quercetalia pubescentis*, *Geranion sanguinei*; H, Eur (centr.); $2n=16$, D; $L_6T_6U_3R_6N_3$; entomophily, proterandry, anemochory, epizoochory.
27. *Clematis vitalba* L. – Band, Cozma, Herghelia, Moreşti, Săbed, Sâncraiu de Mureş, Sântana de Mureş, Tîrgu-Mureş, Ulieş, Zau de Câmpie; *Prunetalia*, *Alnion incanae*; nPh, Eur (centr.); $2n=16$, D; $L_7T_6U_5R_7N_7$; entomophily, proterogyny, anemochory, epizoochory.
28. *Consolida regalis* Gray – Band, Băla, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Sântana de Mureş, Tîrgu-Mureş, Ulieş, Zau de Câmpie; *Caucalidion lappulae*, *Centauretalia cyani*; Th, Eur; $2n=16$, D; $L_6T_6U_4R_7N_4$; entomophily, proterandry, autochory.
29. *Delphinium simonkaianum* Pawł. – Băla-Ercea, *Seslerion rigidae*, *Cynosurion*, H, End; $2n=...$; $L_6T_5U_2R_7$.
30. *Helleborus purpurascens* W. et K. – Cozma, Fărăgău, Herghelia, Lechinioara, Moreşti, Săbed, Sângeorgiu de Mureş, Şeulia, Tîrgu-Mureş, Ulieş, Zau de Câmpie; *Fagetalia*; H, Carp-Balc-Pan; $2n=32$, P; $L_5T_5U_5R_6N_3$; entomophily, proterogyny, mirmecochory.
31. *Hepatica nobilis* Schreb. – Ulieş; *Quercus-Fagetalia*; G, Circ; $2n=14$, D; $L_4T_6U_4R_5N_5$; entomophily, endozoochory, mirmecochory.
32. *Isopyrum thalictroides* L. – Cozma, Herghelia, Ulieş; *Symphyto-Fagion*, *Fagetalia*, *Quercus-Fagetalia*; G, Eur (centr.); $2n=14$, D; $L_4T_xU_5R_7N_4$; entomophily.
33. *Nigella arvensis* L. – Moreşti; *Caucalidion lappulae*; TH, Pont-Med; $2n=12$, D; $L_8T_7U_3R_7N_3$.
34. *Pulsatilla pratensis* (L.) Mill. ssp. ***flavescens*** (Hazsl.) Holub (P. *pratensis* (L.) Mill. ssp. *hungarica* Soó) – Săbed; *Festucetalia valesiaca*; H, Pan-End, Eur; $2n=16$, D; $L_9T_7U_2R_7$.
35. *Pulsatilla vulgaris* Mill. ssp. ***grandis*** (Wender.) Zämelis – Săbed; *Festucetalia valesiaca*; H, Eur (centr.)-End.; $2n=32$, P; $L_9T_6U_3R_7N_1$.
36. *Ranunculus acris* L. – Cozma, Fărăgău, Herghelia, Moreşti, Ulieş; *Molinio-Arrhenatheretea*, H, Euras; $2n=14$, D; $L_7T_xU_6R_xN_x$; entomophily, autogamy, proterandry, endozoochory.
37. *Ranunculus auricomus* L. – Cozma, Herghelia; *Carpinion*, *Quercus-Fagetalia*, *Molinio-Arrhenatheretea*; H, Euras; $2n=16$, D; $L_3T_5U_5R_5N_x$; apogamy, proterandry, autochory, endozoochory, mirmecochory.
38. *Ranunculus ficaria* L. – Band, Cozma, Fărăgău, Herghelia, Luduş, Papiu Ilarian, Săbed, Sântana de Mureş, Şeulia, Tîrgu-Mureş, Ulieş, Zau de Câmpie; *Ulmenion*, *Quercus-Fagetalia*; H, Eur (centr.); $2n=32$, P; $L_4T_5U_6R_5N_x$; anemophily, autochory, endozoochory, mirmecochory.
39. *Ranunculus polyanthemus* L. – Cozma, Fărăgău, Herghelia, Moreşti, Ulieş; *Molinion*, *Geranion sanguinei*; H, Eur; $2n=16$, D; $L_7T_6U_4R_xN_3$; entomophily, anemochory, epizoochory.
40. *Ranunculus repens* L. – Cozma, Fărăgău, Herghelia, Ulieş; H, Euras; *Magnocaricion elatae*, *Rumicion alpini*, *Aegopodion podagrariae*, *Potentillo-Polygonetalia*; $2n=32$, P; $L_6T_xU_7R_xN_xS_1$; entomophily, proterandry, autochory, endozoochory.

41. *Ranunculus sceleratus* L. – Fărăgău, *Bidention*; Th, Circ; $2n=32$, P; $L_9T_xU_{10}R_7N_9S_2$; entomophily, hydrochory, epizoochory, endozoochory.
42. *Thalictrum aquilegifolium* L. – Band, Bozed, Cozma, Fărăgău, Herghelia, Moişa, Moreşti, Târgu-Mureş, Ulieş, Zau de Câmpie; *Alnion incanae*, *Adenostylion alliariae*, *Molinietalia*; H, Eur; $2n=14$, D; $L_5T_xU_8R_7N_8$; anemophily, entomophily, autogamy, proterogyny, anemochory, zoochory.
43. *Thalictrum flavum* L. – Cozma, Moreşti, Ulieş; H, Euras; *Filipendulion*, *Molinietalia*; $2n=84$, P; $L_7T_6U_8R_7N_5$; anemophily, entomophily, anemochory, zoochory.
44. *Thalictrum lucidum* L. – Cozma, Moreşti; *Molinion*, *Filipendulion*; H, Eur (cont.); $2n=28$, P; $L_8T_5U_8R_7N_3$; anemophily, entomophily, anemochory, zoochory.
45. *Thalictrum minus* L. – Cozma, Fărăgău, Săbed, Lechincioara, Moreşti, Ulieş, Zau de Câmpie; *Geranion sanguinei*, *Festuco-Brometea*; H, Euras (cont.); $2n=42$, P; $L_7T_xU_3R_7N_3$; anemophily, entomophily, anemochory, zoochory.

PAPAVERALES

PAPAVERACEAE

46. *Chelidonium majus* L. – Band, Băla, Ceuaşu de Câmpie, Cozma, Fărăgău, Glodeni, Herghelia, Moreşti, Porumbeni, Râciu, Săbed, Sâncraiu de Mureş, Sânmărghita, Sânger, Papiu Ilarian, Sâmpetru de Câmpie, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Vaidei, Petea, Voiniceni, Voivodeni; *Arction lappae*, *Lamio-Chenopodietalia*; H, Euras; $2n=12$, D; $L_6T_6U_5R_xN_8$; entomophily, autogamy, proterandry, mirmecochory, autochory, anthropochory.
47. **Papaver somniferum* L. – Ulieş; Th, Med; $2n=22$, D.
48. *Papaver rhoeas* L. – Band, Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Centauretalia cyani*, *Stellarietea mediae*, *Caucalidion*; Th, Cosm; $2n=14$, D; $L_7T_6U_4R_7N_x$; entomophily, anemochory, autochory, anthropochory.

FUMARIACEAE

49. *Corydalis cava* (L.) Schweigg. et Körte – Şeulia, Târgu-Mureş; *Fagetalia*; G, Eur (centr.); $2n=16$, D; $L_3T_6U_6R_6N_8$.
50. *Corydalis solida* (L.) Clairv. ssp. *silvenensis* (Velen.) Hayek – Band, Cozma, Herghelia, Săbed, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; G, Balc; $2n=16$ (24, 32), D; $L_3T_6U_5R_7N_7$; entomophily, autogamy, endozoochory, mirmecochory.
51. *Fumaria officinalis* L. – Cozma, Herghelia, Săbed, Şeulia, Ulieş; *Veronico-Euphorbion*; Th, Eur; $2n=32$, P; $L_6T_xU_5R_7N_7$; entomophily, mirmecochory, endozoochory.
52. *Fumaria schleicheri* Soy.-Will. – Band, Şeulia; *Stellarietea mediae*, *Polygono-Chenopodion*, Th, Euras; $2n=...$; $L_7T_6U_4R_7N_7$.
53. *Fumaria vaillantii* Loisel. – Săbed, Târgu-Mureş; *Centauretalia cyani*, *Caucalidion lappulae*; Th, Euras; $2n=32$, P; $L_6T_6U_4R_7N_8$.

URTICALES

ULMACEAE

54. *Ulmus glabra* Huds. – Band, Săbed, Târgu-Mureş, Zau de Câmpie; *Tilio-Acerion*, *Querco-Fagetea*; Ph, Euras; $2n=28$, P; $L_4T_5U_7R_xN_7$.
55. *Ulmus laevis* Pall. – Band, Sânger; *Ulmenion*, *Tilio-Acerion*; Ph, Eur; $2n=28$, P; $L_4T_6U_8R_7N_7$.
56. *Ulmus minor* Mill. – Band, Cozma, Herghelia, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Ulmenion*; Ph, Eur; $2n=28$, P; $L_5T_7U_4R_6N_x$; anemophily, anemochory.

MORACEAE

57. **Morus alba* L. – Cozma, Fărăgău, Săbed, Ulieş; Ph, China; 2n=28, P; (sub-spontaneous).
58. **Morus nigra* L. – Ulieş; Ph, Med; 2n=90–106, 138, P.

CANNABACEAE

59. *Humulus lupulus* L. – Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureş, Ulieş; *Alnion glutinosae*, *Alnion incanae*, *Rhamno-Prunetea*, H, Euras, Am-N; 2n=20, D; $L_7T_6C_3U_8R_6N_8$; anemophily, anemochory, anthropochory.

URTICACEAE

60. *Urtica dioica* L. – Band, Cozma, Fărăgău, Herghelia, Moreşti, Porumbeni, Râciu, Săbed, Sâncraiu de Mureş, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Voiniceni, Voivodeni, Zau de Câmpie; *Rumicion alpini*, *Artemisietea*, *Galio-Urticetea*, *Sambuco-Salicion capreae*, *Alnion incanae*; H-G, Cosm; 2n=26, 48, 52, D-P; $L_xT_xU_6R_xN_8$; anemophily, endozoochory, anthropochory.
61. *Urtica urens* L. – Cozma; *Arction lappae*; Th, Cosm; 2n=24, P; $L_7T_6U_5R_xN_8$; anemophily, endozoochory, anthropochory.

FAGALES

FAGACEAE

62. *Castanea sativa* Mill. – Herghelia, Săbed; *Pino-Quercetalia*, *Quercion farnetto*, *Quercion roboris*; Ph, Med (specie relict de cultură); 2n=24, D; $L_7T_5U_4R_5$; entomophily, partly anemophily, endozoochory.
63. *Fagus sylvatica* L. – Herghelia, *Fagetalia*, *Symphyto-Fagion*; Ph, centr. Eur-Atl; 2n=24, D; $L_3T_4U_5R_5N_x$.
64. *Quercus petraea* (Matt.) Liebl. – Band, Cozma, Herghelia, Săbed, Şeulia, Ulieş, Zau de Câmpie; *Querco-Fagetea*, *Quercion pubescentis-sessiliflorae*; Ph, Eur; 2n=24, D; $L_6T_5U_5R_xN_x$; anemophily, anemochory, endozoochory, epizoochory.
65. *Quercus robur* L. – Band, Cozma, Herghelia, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Querco-Fagetea*, *Aceri-Quercion*; Ph, Eur; 2n=24, D; $L_7T_6U_xR_xN_x$; anemophily, anemochory, endozoochory, epizoochory.

BETULACEAE

66. *Alnus glutinosa* (L.) Gaertn. – Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Alnion glutinosae*, *Alnenion glutinoso-incanae*; Ph, Euras; 2n=28, P; $L_5T_5U_9R_6N_x$; anemophily, proterogyny, polygyny, polygamy, anemochory, hydrochory.
67. *Betula pendula* – Şeulia, Târgu-Mureş, Zau de Câmpie; *Querco-Fagetea*, *Dicrano-Pinion*, *Erico-Pinetalia*, *Sambuco-Salicion*; Ph, Euras; 2n=28, 42, P; $L_8T_xU_xR_xN_x$; anemophily, anemochory.

CORYLACEAE

68. *Carpinus betulus* L. – Bada, Bozed, Cozma, Fărăgău, Glodeni, Lechinţa, Herghelia, Săbed, Moreşti, Târgu-Mureş, Săbed, Ulieş, Voiniceni; *Lathyro-Carpinion*, *Prunetalia spinosae*; MPh-mPh, Eur (centr.); 2n=64, P; $L_4T_6U_xR_xN_x$; anemophily, anemochory, endozoochory.
69. *Corylus avellana* L. – Balda, Band, Bozed, Cozma, Fărăgău, Herghelia, Lechinţa, Ogra, Sânpaul, Săbed, Şeulia, Sâncraiu de Mureş, Târgu-Mureş, Ulieş, Voiniceni, Zau de

Cîmpie; *Rhamno prunetea*, *Quercu-Fagetea*; Ph, Eur; $2n=22$, D; $L_6T_5U_xR_xN_x$; anemophily, endozoochory.

JUGLANDALES

JUGLANDACEAE

70. *Juglans regia* L. – Cozma, Fărăgău, Herghelia, Săbed, Sâncraiu de Mureș, Sânmărgăhita, Sântana de Mureș, Șăușa, Tăureni, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; Ph, Eur (centr.)-Balc-Cauc; $2n=32$, P; autogamy, zoochory; (sub-spontaneous).

CARYOPHYLLALES

PORTULACACEAE

71. *Portulaca oleracea* L. – Cozma, Ulieș; *Amarantho-Chenopodion albi*, *Eragrostietalia*, *Stellarietalia mediae*; Th, Cosm; $2n=54$, P; $L_7T_6U_4R_7N_7$; entomophily, autogamy, cleistogamy, autochory, mirmecochory.

CARYOPHYLLACEAE

72. *Agrostema githago* L. – Band, Cozma, Târgu-Mureș; *Centauretalia cyani*, *Stellarietalia medie*; Th, Cosm; $2n=48$; $L_7T_xU_xR_xN_x$.
73. *Cerastium fontanum* Baumg. (*Cerastium holosteoides* Fr.) – Cozma, Fărăgău, Morești, Ulieș; *Potentillo ternatae-Nardion*, *Molinio Arrhenatheretea*; H-Ch, Euras; $2n=144$, P; $L_7T_xU_5R_xN_5$; entomophily, autogamy, proterandry, proterogyny, anemochory.
74. *Cucubalus baccifer* L. – Cozma, Herghelia; *Convolvuletalia sepium*, *Galio-Urticetea*, *Salicion albae*; H, Euras; $2n=24$, D; $L_6T_6U_8R_7N_7$; entomophily, proterandry, endozoochory.
75. *Dianthus armeria* L. – Cozma, Fărăgău, Morești, Ulieș; *Sedo-Scleranthion*, *Quercetea pubescentis*; T, Eur; $2n=30$, D; $L_7T_6U_4R_xN_3$; entomophily, autogamy, polygamy, anemochory, endozoochory, autochory.
76. *Dianthus carthusianorum* L. – Cozma, Fărăgău, Herghelia, Săbed, Lechincioara, Morești, Ulieș; *Cynosurion*; H, Eur; $2n=30$, D; $L_8T_5U_4R_5N_0$; entomophily, proterandry, anemochory, endozoochory, autochory.
- var. *saxigenus* (Schur) – Herghelia.
77. *Gypsophila muralis* L. – Cozma, Ulieș; *Isoëto-Nanojuncetea*, *Festucion pseudovinae*; Th, Euras; $2n=34$, D; $L_8T_6U_5R_7N_2S_2$; entomophily, proterandry, anemochory, endozoochory, autochory.
78. *Lychnis flos-cuculi* L. – Herghelia, Morești, Săbed, Ulieș; *Molinietalia*, *Molinio-Arrhenatheretea*, *Magnocaricion elatae*; H, Euras; $2n=24$, D; $L_7T_5U_6R_xN_x$; entomophily, proterandry, anemochory, autochory, endozoochory.
79. *Saponaria officinalis* L. – Band, Cozma, Herghelia, Săbed, Târgu-Mureș, Ulieș; *Galio-Alliarion*, *Salicetea purpureae*, *Senecion fluviatilis*; H, Euras; $2n=28$, P; $L_7T_6U_5R_7N_5$; entomophily, proterandry, anemochory.
80. *Silene bupleuroides* L. (*Silene longiflora* Ehrh.) – Zau de Câmpie; *Festucion valesiaca*; H, Pont-centr. Eur-Med; $2n=24$, D; $L_7T_6U_2R_7N_x$.
81. *Silene italica* (L.) Pers. – Fărăgău, Morești, *Quercetalia pubescentis*, *Fraxino-Cotinetalia*; H, Med; $2n=24$, D; $L_7T_7U_5R_7N_x$; entomophily, anemochory.
82. *Silene otites* (L.) Wibel – Fărăgău, Săbed; *Festuco-Brometea*, *Stipo-Festucetalia pallentis*; H, Eur (centr.&SV); $2n=24$, D; $L_8T_7U_2R_xN_2$; entomophily, anemophily, endozoochory.
83. *Silene latifolia* Poiret ssp. *alba* (Mill.) Greut. et Burd. – Fărăgău, Morești, *Artemisietea*, *Galio-Urticetea*, *Onopordion*, *Origanetalia*; T, Euras; $2n=24$, D; $L_8T_xU_4R_xN_7$; entomophily, anemophily, endozoochory, autochory.

84. *Silene vulgaris* (Moench) Garcke – Cozma, Fărăgău, Herghelia, Săbed, Moreşti, Ulieş; *Geranion sanguinei*, *Dauco-Melilotion*, *Arrhenatheretalia*; H, Euras; $2n=24$, D; $L_8T_xU_4R_xN_2$; entomophily, autogamy, proterandry, polygamy, anemochory, endozoochory.
85. *Stellaria graminea* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Arrhenatheretalia*, *Molinio-Arrhenatheretea*; H, Euras; $2n=26$, D; $L_6T_xU_5R_6N_5$; entomophily, autogamy, proterandry, anemochory, endozoochory.
86. *Stellaria holostea* L. – Cozma, Fărăgău, Herghelia, Săbed, Ulieş; *Lathyro-Carpinion*, *Querco-Fagetea*; H-Ch, Euras; $2n=26$, D; $L_5T_6U_5R_6N_5$; entomophily, autogamy, proterandry, anemochory, endozoochory.
87. *Stellaria media* (L.) Vill. – Cozma, Herghelia; *Alnion incanae*, *Adenostilion alliariae*, *Galio-Alliarion*; T, Cosm; $2n=40$, P; $L_6T_xU_4R_xN_8$; entomophily, autogamy, endozoochory, anemochory, anthropochory.
88. *Stellaria nemorum* L. – Herghelia, Moreşti, Ulieş; *Alno-Ulmion*; H, Eur; $2n=26$, D; $L_4T_5U_7R_5N_7$; entomophily, autogamy, proterandry, anemochory, endozoochory.

AMARANTHACEAE

89. *Amaranthus retroflexus* L. – Cozma, Fărăgău, Ulieş; *Chenopodietalia albi*, Th, Adv (Am-N); $2n=34$, D; $L_9T_xU_4R_xN_9$; entomophily, anemophily, anemochory, epizoochory.

CHENOPODIACEAE

90. *Chenopodium album* L. – Cozma, Fărăgău, Ulieş; *Stellarietalia mediae*, *Amarantho-Chenopodion albi*; Th, Cosm; $2n=36$, 54, P; $L_xT_xU_4R_xN_7$; autogamy, endozoochory, anthropochory.
91. *Chenopodium hybridum* L. – Cozma, Fărăgău, Ulieş; *Veronico-Euphorbion*, *Caucalidion lappulae*, Th, Cosm; $2n=18$, D; $L_7T_5U_5R_7N_8$; autogamy, endozoochory, anthropochory.

PLUMBAGINALES

PLUMBAGINACEAE

92. *Goniolimon tataricum* (L.) Boiss. – Tăureni, Zau de Câmpie; *Festuco-Brometea*, *Pimpinello-Thymion zygoides*; H, Pont-Pan-Balc; $2n=16$, 32; $L_9T_7U_1R_7N_x$.

POLYGONALES

POLYGONACEAE

93. *Fallopia convolvulus* (L.) A. Löve (*Polygonum convolvulus* (L.) Gross) – Fărăgău, Herghelia, Săbed, Ulieş; *Stellarietalia mediae*; Th, Circ; $2n=40$, P; $L_7T_xU_xR_xN_x$; autogamy, entomophily, mirmecochory, anthropochory.
94. *Fallopia dumetorum* (L.) Holub (*Polygonum dumetorum* L.) – Săbed Ulieş; *Senecion fluvialis*, *Convolvuletalia sepium*, *Galio-Alliarion*; Th, Circ; $2n=20$, D; $L_6T_xU_5R_xN_6$; autogamy, entomophily, anemochory, endozoochory.
95. *Polygonum amphibium* L.
– f. *terrestre* Leyss. – Fărăgău, *Potentillo-Polyganetalia*, *Veronico-Euphorbion*; Hh-G, Subcosm; $2n=66$, P; $L_8T_5U_8R_xN_6$; entomophily, hidrozoochory, epizoochory, autochoria.
– f. *aquaticum* Leyss. – Fărăgău, *Potamion*, *Nymphaeion*; Hh, Cosm; $L_7T_xU_{11}R_xN_7$.
96. *Polygonum aviculare* L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Şăuşa, Târgu-Mureş, Ulieş; *Stellarietalia mediae*, *Lolio-Plantaginion*; Th, Cosm; $2n=60$, P; $L_7T_xU_xR_xN_x$; autogamy, mai rar entomophily, epizoochory, endozoochory, anemochory, anthropochory.

97. *Polygonum bistorta* L. – Herghelia, Săbed; *Molinietalia*, *Calthion*, *Alnenion glutinoso-incanae*, *Polygono-Trisetion*; H, Euras; $2n=44$, P; $L_7T_4U_7R_5N_5$; entomophily, proterandry, autochory, epizoochory, endozoochory.
98. *Polygonum hydropiper* L. – Ulieș; *Bidentetalia*, *Chenopodion rubri*, *Veronico-Euphorbion*, *Alnenion glutinoso-incanae*; Th, Circ; $2n=20$, D; $L_7T_6U_8R_xN_5$; entomophily, endozoochory.
99. *Polygonum mite* Schrank – Cozma, Ulieș; *Bidentetalia*, *Alno-Fraxinetalia*; Th, Eur; $2n=40$, P; $L_7T_6U_8R_xN_7$; entomophily, endozoochory, epizoochory.
100. *Polygonum persicaria* – Fărăgău, Târgu-Mureș; *Bidentetalia*, *Stellarietalia mediae*, *Molinio-Arrhenatheretalia*; T, Cosm; $2n=22, 44$, D-P; $L_7T_6U_5R_7N_7$.
101. *Reynoutria sachalinensis* (F. Schmidt) Nakai – Fărăgău; G, Adv-Sahalin; $2n=44$, P.
102. *Rumex acetosa* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Sântana de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Molinio-Arrhenatheretalia*; H, Cosm; $x=4, 5, 7, 8, 9, 10$, $2n=14$, D; $L_8T_xU_xR_xN_x$; anemophily, autogamy, anemochory, endozoochory.
103. *Rumex acetosella* L. – Band, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Scleranthion annui*, *Stellarietalia mediae*, *Koelerio-Corynephorretalia*; H-G, Eur; $2n=28, 42$, P; $L_8T_xU_5R_6N_2$; anemophily, autogamy.
104. *Rumex conglomeratus* Murray – Târgu-Mureș, Ulieș; *Bidentetalia*, *Potentillo-Polygonetalia*; H, Circ; $2n=20$, D; $L_8T_7U_7R_xN_8$; anemophily, endozoochory.
105. *Rumex crispus* L. – Band, Cozma, Fărăgău, Glodeni, Herghelia, Morești, Săbed, Sântana de Mureș, Sângiorgiu de Mureș, Târgu-Mureș, Ulieș; *Potentillion anserinae*, *Polygono-Chenopodion*; H, Euras; $2n=60$, P; $L_7T_xU_6R_xN_5$; anemophily, endozoochory.
106. *Rumex sanguineus* L. – Cozma, Fărăgău, Ulieș; *Galio-Alliarion*, *Fagetalia*; H, Eur; $2n=20$, D; $L_4T_5U_8R_7N_7$; anemophily, zoochory.

ROSALES

ROSACEAE

107. *Agrimonia eupatoria* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Origanetalia*, *Festuco-Brometalia*; H, Euras; $2n=28$, P; $L_7T_xU_4R_xN_4$; entomophily, autogamy, epizoochory.
108. *Agrimonia pilosa* Ledeb. – Herghelia, Săbed, Morești, Ulieș; *Trifolion medii*; H, Euras; $2n=28, 56$, P; $L_6T_5U_5R_6N_x$; entomophily, autogamy, epizoochory.
109. *Crataegus monogyna* Jacq. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Rhamno-Prunetalia*, *Quercu-Fagetalia*, *Aceri-Quercion*; mPh, Euras; $2n=34$, D; $L_7T_xU_4R_xN_3$; entomophily, proterogyny, endozoochory.
110. *Filipendula ulmaria* (L.) Maxim. – Cozma, Fărăgău, Herghelia, Săbed, Zau de Câmpie; *Filipendulion*, *Alnion incanae*; H, Euras; $2n=14$, D; $L_7T_xU_8R_xN_4$; entomophily, anemochory, hydrochory, endozoochory;
111. *Filipendula vulgaris* Moench – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Festuco-Brometalia*, *Geranion sanguinei*; H, Euras; $2n=14, 16$, D; $L_7T_xU_4R_xN_2$; autogamy, endozoochory.
112. *Fragaria vesca* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Săbed, Sântana de Mureș, Șeulia, Târgu-Mureș, Ulieș; *Atropetalia*, *Geranion sanguinei*, *Fagetalia*, *Prunetalia spinosae*; H, Euras; $2n=14$, D; $L_4T_xU_5R_xN_6$; entomophily, autogamy, proterogyny, endozoochory.
113. *Fragaria viridis* Duch. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festuco-Brometalia*, *Quercetalia*

- pubescentis*, *Cirsio-Brachypodion*, *Geranion sanguinei*; H, Euras; $2n=14$, D; $L_6T_5U_3R_7N_3$; entomophily, autogamy, proterogyny, endozoochory.
114. ***Geum urbanum*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Lamio-Chenopodietalia*, *Quercu-Fagetea*, *Fagetalia*, *Prunetalia spinosae*; H, Circ; $2n=42$, P; $L_4T_xU_3R_xN_7$; entomophily, autogamy, proterogyny, epizoochory.
115. ***Malus sylvestris*** Mill. – Band, Cozma, Fărăgău, Herghelia, Săbed, Sărmaş, Ulieş; *Ulmenion*, *Prunetalia spinosae*, *Quercu-Fagetea*; MPh, Eur; $2n=34$, D; $L_7T_6U_5R_xN_5$; entomophily, proterogyny, endozoochory.
116. ***Potentilla anserina*** L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Magnocaricion elatae*, *Bidention*, *Potentillion anserinae*, *Scorzonero-Juncion gerardii*; H, Cosm; $2n=28, 35, 42$, P; $L_7T_xU_6R_xN_7S_1$; entomophily, autogamy, endozoochory, hydrochory, vegetative propagation.
117. ***Potentilla argentea*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Koelerio-Corynephoratea*, *Festuco-Brometea*, *Asplenio-Festucion pallentis*; H, Euras; $2n=14$, D; $L_9T_xU_3R_xN_1$; entomophily, anemochory.
118. ***Potentilla cinerea*** Chaix – Band, Băla, Cozma, Ercea, Fărăgău, Lechincioara, Moreşti, Răzoare, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Stipo-Festucetalia pallentis*, *Thymion-Festucion rupicolae*, *Festucetalia valesiacae*; H, Eur; $2n=14, 28, 35, 42, 56$ D-P; $L_7T_6U_1R_7N_1$; entomophily, anemochory.
119. ***Potentilla erecta*** (L.) Răusch. (*Potentilla tormentilla* Stokes) – Cozma, Lechincioara, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Nardo-Callunetea*, *Molinio-Arrhenatheretea*; H, Euras; $2n=28$, P; $L_7T_5U_4R_5N_2$; entomophily, anemochory, endozoochory.
120. ***Potentilla heptaphylla*** L. – Cozma, Herghelia; *Festuco-Brometea*; H, Eur (Cont); $2n=14, 28, 30, 35$, D-P; $L_7T_5U_3R_7N_5$.
121. ***Potentilla recta*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festuco-Brometea*; H, Euras (cont.); $2n=28, 42$, P; $L_9T_7U_3R_7N_2$; entomophily, anemochory, zoochory.
122. ***Potentilla reptans*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Târgu-Mureş, Ulieş, Zau de Câmpie; *Geranion sanguinei*; H, Euras; $2n=28$, P; $L_6T_6U_6R_7N_5$; entomophily, autogamy, endozoochory, mirmecochory.
123. ***Potentilla thuringiaca*** Bernh. – Moreşti, *Seslerion albicantis*, *Geranion sanguinei*; H, Eur (cont.); $2n=42$, P; $L_6T_5U_4R_6N_3$; entomophily, anemochory, zoochory.
124. ***Prunus avium*** L. (*Cerasus avium* (L.) Moench) – Balda, Band, Băla, Cozma, Fărăgău, Herghelia, Săbed, Şeulia, Ulieş, Zau de Câmpie; *Lathyro-Carpinion*; MPh-mPh, subMed; $2n=16, 24, 32$, D-P; $L_6T_6U_5R_xN_5$; entomophily, proterogyny, endozoochory.
125. ***Prunus fruticosa*** Pall. – Băla, Cozma, Câmpeniţa, Ercea, Lechinţa, Săbed, Sărmaşel, Ulieş, Voivodeni; *Prunion spinosae*, *Quercetalia pubescentis*; Ph, Euras (cont.); $2n=32$, P; $L_8T_6U_3R_7N_x$.
126. ***Prunus mahaleb*** L. (*Cerasus mahaleb* (L.) Miller) – Săbed; *Prunion spinosae*, *Quercetalia pubescentis*, *Quercion pubescentis-sessiliflorae*, *Berberidion*; Ph, subMed; $2n=16$, D; $L_7T_7U_3R_8N_2$.
127. ***Prunus padus*** L. (*Padus racemosa* (Lam.) Gilib.) – Ulieş; *Fraxinetalia*, *Alnenion glutinosae-incanae*, *Alnion incanae*, *Alnetalia glutinosae*; MPh, Euras; $2n=32$, P; $L_5T_5U_8R_5N_6$; entomophily, proterogyny, endozoochory.
128. ***Prunus spinosa*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Prunion spinosae*; Ph, Eur; $2n=32$, P; $L_7T_6U_xR_xN_x$; entomophily, proterogyny, ornithochory.

129. *Prunus tenella* Batsch – Band, Chețani, Cozma, Fărăgău, Herghelia, Lechința, Lechincioara, Luduș, Morești, Săbed, Sărmaș, Târgu-Mureș, Ulieș, Zau de Câmpie; *Prunion spinosae*; Ph, Euras (cont.); $2n=16,24$, D-P; $L_7T_6U_3R_7N_8$.
130. *Pyrus pyrastrer* Burgsd. – Band, Cipău, Cozma, Fărăgău, Herghelia, Lechința, Lechincioara, Luduș, Morești, Săbed, Sărmaș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Quercu-Fagetea*, *Ulmenion*, *Quercetalia pubescentis*, *Aceri-Quercion*, *Berberidion*; MPh, Eur; $2n=34$, D; $L_6T_6U_xR_xN_4$; entomophily, proterogyny, endozoochory.
131. *Rosa canina* L. – Band, Cozma, Fărăgău, Herghelia, Ceuașu de Câmpie, Cămpenița, Lechincioara, Morești, Râciu, Săbed, Sâncraiu de Mureș, Sîntana de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni, Zau de Câmpie; *Quercu-Fagetea*, *Quercetalia roboris*, *Quercetea pubescentis*; nPh, Eur; $2n=35$, P; $L_8T_xU_4R_xN_x$; entomophily, endozoochory.
132. *Rosa gallica* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Quercetalia pubescentis*, *Berberidion*, *Geranion sanguinei*; nPh, Pont-Med; $2n=21,28$, P; $L_7T_7U_4R_7N_4$; entomophily, endozoochory.
133. *Rubus caesius* L. – Cozma, Fărăgău, Herghelia, Săbed, Morești, Ulieș; *Galio-Urticetea*, *Prunion spinosae*, *Fraxinetalia*, *Alnion incanae*; nPh, Eur; $2n=28$, P; $L_7T_6U_7R_7N_9$; entomophily, autogamy, endozoochory.
134. *Rubus hirtus* W. et K. – Cozma, Herghelia; *Sambuco-Salicion*, *Fagetalia*, *Quercu-Fagetea*; Ph, Eur (centr.&V); $2n=28$, P; $L_4T_4U_5R_5N_x$; entomophily, autogamy, endozoochory.
135. *Sanguisorba minor* Scop. – Fărăgău, Herghelia, Săbed, Ulieș; *Festuco-Brometea*, *Corynephorretalia*; H, Euras; $2n=28$, P; $L_7T_6U_3R_7N_2$; anemophily, anemochory.
136. *Sanguisorba officinalis* L. – Băla, Ercea Herghelia, Săbed; *Molinietalia*; H, Circ; $2n=28,42,56$, P; $L_7T_5U_7R_xN_3$; entomophily, autogamy, anemochory, endozoochory.

SAXIFRAGALES

GROSSULARIACEAE

137. *Ribes uva-crispa* L. (*Ribes grossularia* L.) – Cozma, Herghelia, Ulieș; *Fagetalia*, *Tilio-Acerion*, *Prunetalia*; mPh, Eur; $2n=16$, D; $L_4T_5U_xR_xN_6$; entomophily, proterandry, endozoochory;

CRASSULACEAE

138. *Sedum telephium* L. ssp. *maximum* (L.) Krock. – Fărăgău, Săbed, Ulieș; *Asplenietea*, *Androsacetalia vandellii*, *Thlaspietea*, *Galio-Urticetea*, *Quercu-Fagetea*; H, Eur; $2n=48$, P; $L_8T_6U_4R_6N_3$; entomophily, proterandry, anemochory, endozoochory.

PARNASSIACEAE

139. *Parnassia palustris* L. – Fărăgău; *Caricetalia davallianae*, *Molinion*; H, Circ; $2n=18$, D; $L_8T_xU_8R_6N_2$.

FABALES (LEGUMINOSAE)

FABACEAE

140. **Amorpha fruticosa* L. – Fărăgău, Săbed; *Salicion albae*; Ph, Adv, Am-N; $2n=40$, . . ; $L_8T_xU_xR_xN_x$; ornamental, cultivated and sub-spontaneous.
141. *Anthyllis vulneraria* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festuco-Brometea*; H, Atl; $x=6$, $2n=12$, D; $L_8T_xU_4R_xN_3$; entomophily, anemochory, endozoochory.
142. *Astragalus asper* Jacq. – Balda, Sărmașel, Zau de Câmpie; *Festucion valesiacae*; H, Pont-Pan; $2n=64$, P; $L_8T_6U_3R_7N_2$.

143. *Astragalus austriacus* Jacq. – Fărăgău, Lechincioara, Moreşti, Săbed, Ulieş, Zau de Câmpie; *Festucion rupicola*-*Festucion valesiaca*; H, Euras (cont.); $2n=16$, D; $L_9T_6U_3R_7$; entomophily, anemochory, endozoochory.
144. *Astragalus cicer* L. – Moreşti, Ulieş; *Trifolio-Geranieta*, *Origanetalia*; H, Euras (cont); $2n=64$, P; $L_7T_6U_4R_7N_x$.
145. *Astragalus dasyanthus* – Balda, Band, Băla, Căpuşu de Câmpie, Ceuaşu de Câmpie, Cheţani, Miheşu de Câmpie, Oroiu, Papiu Ilarian, Săbed, Sântana de Mureş, Săbed, Târgu-Mureş, Zau de Câmpie; *Quercetalia pubescentis*; H, Pont-Pan; $2n=16$, D; $L_8T_6U_3R_7N_2$.
146. *Astragalus exscapus* L. ssp. *transilvanicus* (Barth) Jav. – Cheţani, Săbed, Sărmăşel, Ulieş; *Festucion vaginata*, *Festucion rupicola*; H, Pont-End; $2n=16$, D; $L_8T_6U_3R_7$.
147. *Astragalus glycyphyllos* L. – Balda, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Trifolio-Geranieta*, *Berberidion*; H, Euras (subMed); $2n=16$, D; $L_7T_6U_4R_7N_4$; entomophily, epizoochory.
148. *Astragalus monspessulanus* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festuco-Brometea*; H, Pont-Med; $2n=16$, D; $L_8T_6U_2R_7N_2$; entomophily, anemochory, endozoochory.
149. *Astragalus onobrychis* L. – Cozma, Lechinţa, Moreşti, Săbed, Ulieş; *Festucetalia valesiaca*; H, Euras (cont.); $2n=64, 72$, P; $L_9T_xU_3R_xN_x$.
150. *Cytisus albus* (Hacq.) Rothm. – Cozma, Fărăgău, Moreşti, Săbed; *Festucetalia valesiaca*, *Aceri-Quercion*; Ph, Pont-Pan-Balc; $2n=24$, P; $L_6T_6U_4R_7$; entomophily, anemochory, endozoochory.
151. *Cytisus hirsutus* L. ssp. *leucotrichus* (Schur) A. Löve&D. Löve (*Cytisus leucotrichus* Schur) – Fărăgău, *Festuco-Brometea*, *Quercetea pubescentis*; Ph, Balc-Pan; $2n=46$, P; $L_6T_6U_4R_7N_2$; entomophily, endozoochory, autochory.
152. *Coronilla varia* L. – Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Artemisio-Agropyron*, *Trifolio-Geranieta*, *Quercetalia pubescentis*, *Origanetalia*, H, Centr-Eur (subMed); $2n=24$, P; $L_7T_xU_4R_xN_3$; entomophily, anemochory.
153. *Dorycnium pentaphyllum* Scop. ssp. *herbaceum* (Vill.) Rouy – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Geranion sanguinei*, *Cirsio-Brachypodion*; Ch, Eur (centr.&SE); $2n=14$, D; $L_7T_6U_3R_7$; entomophily, endozoochory, autochory.
154. *Genista sagittalis* L. – Band, Cozma, Fărăgău, Herghelia, Şeulia, Târgu-Mureş, Zau de Câmpie; *Vaccinio-Genistetalia*; H, Atl centr., Eur-Med; $2n=44$, P; $L_8T_5U_4R_4N_2$; entomophily, autogamy, anemochory, endozoochory.
155. *Genista tinctoria* L. ssp. *tinctoria* (incl. *Genista oligosperma* Simonkai) – Fărăgău, Herghelia, Săbed; *Genisto-Quercion*, *Molinietalia*; Ch, Euras; $2n=48$, P; $L_8T_xU_5R_xN_2$; entomophily, autogamy, anemochory, endozoochory;
156. *Gleditsia triacanthos* L. – Săbed; MPh, Adv-Am-N; $2n=28$, P; cultivated, ornamental, (sub-spontaneous).
157. *Lathyrus latifolius* L. – Cozma; *Quercetalia*, *Quercetea pubescentis*; H, S-Eur; $2n=14$, D; $L_6T_6U_5R_6N_2$.
158. *Lathyrus niger* (L.) Bernh. – Herghelia, Săbed; *Querco-Fagetea*, *Genisto-Quercion*, *Quercion pubescentis-sessiliflorae*; H, Eur (centr.); $2n=14$, D; $L_5T_6U_4R_xN_3$; entomophily, autochory, endozoochory.
159. *Lathyrus pallescens* (M. Bieb.) K. Koch – Balda, Cheţani, Fărăgău, Giuluş, Lechinţa, Miheşu de Câmpie, Săbed, Târgu-Mureş, Zau de Câmpie; *Festucion valesiaca*; H, Pont-Pan-Balc; $2n=...$; $L_8T_6U_4R_7N_2$.
160. *Lathyrus palustris* L. – Fărăgău; *Magnocaricion elata*, *Molinietalia*, *Phragmitetalia*; H, Circ; $2n=42$, P; $L_8T_xU_8R_xN_3$; entomophily, endozoochory

161. *Lathyrus pannonicus* (Jacq.) Garke – Zau de Câmpie; *Geranion sanguinei*, *Quercetea pubescentis*; H, Eur (centr.&NV)-Balc; $2n=14$, D; $L_8T_7U_3R_7N_2$; entomophily, anemochory, endozoochory.
162. *Lathyrus pratensis* L. – Morești; *Trifolion medii*, *Molinio-Arrhenatheretea*, *Molinietalia*; H, Euras; $2n=14$, D; $L_7T_5U_6R_6N_6$; entomophily, autochory, endozoochory.
163. *Lathyrus tuberosus* L. – Oreșniță; Cozma, Morești, Ulieș; *Caucalidion*, *Secalietea*; H, Euras; $x=7$, $2n=14$, D; $L_7T_6U_4R_7N_4$; entomophily, autochory, zoochory.
164. *Lathyrus vernus* (L.) Bernh. – Herghelia, Săbed; *Fagetalia*, *Lathyro-Carpinenion*; H, Euras; $2n=14$, D; $L_4T_6U_4R_7N_x$; entomophily, autochory, endozoochory.
165. *Cytisus nigricans* L. (*Lembotropis nigricans* (L.) Griseb.) – Cozma, Morești, *Pino-Quercetalia*; Ph, Eur (centr. &SV); $2n=48$, 96, P; $L_6T_6U_4R_6N_2$; entomophily, autochory, zoochory.
166. *Lotus corniculatus* L. – Cozma, Fărăgău, Herghelia, Săbed, Morești, Ulieș; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Puccinellietalia*; H, Euras; $2n=24$, P; $L_7T_xU_4R_xN_2$; entomophily, autochory, zoochory.
167. *Medicago falcata* L. – Band, Băla, Cozma, Ercea Fărăgău, Herghelia, Lechincioara, Morești, Răzoare, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Trifolio-Geranieta*, *Festuco-Brometea*; H, Euras; $2n=16$, 32, D-P; $L_8T_6U_3R_7N_3$; entomophily, autochory, epizoochory.
168. *Medicago lupulina* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Dauco-Melilotion*, *Alysso-Sedion*, *Caucalidion*, T, Euras; $2n=16$, 32, D-P; $L_7T_xU_4R_xN_x$; entomophily, autochory, endozoochory.
169. *Medicago minima* (L.) Grufb. – Cozma, Fărăgău, Săbed, Morești, Ulieș; *Koelerio-Coryneporetea*, *Festuco-Brometea*, *Alysso-Sedion*; Th, subMed; $2n=16$, D; $L_9T_6U_3R_7N_1$; entomophily, endozoochory, epizoochory.
170. **Medicago sativa* L. – Band, Cozma, Fărăgău, Porumbeni, Târgu-Mureș, Zau de Câmpie, Ulieș; *Festuco-Brometea*, *Stellarietia mediae*; H, Eur (E)-Asia (centr.); $2n=32$, P; $L_8T_6U_4R_7$; entomophily, autogamy, epizoochory.
171. *Melilotus alba* Medik. – Cozma, Fărăgău, Săbed, Ulieș; *Dauco-Melilotion*, *Convolvulo-Agropyron*; Th, Euras; $2n=16$, D; $L_9T_xU_3R_xN_3$; entomophily, endozoochory.
172. *Melilotus officinalis* (L.) Pall. – Band, Băla, Ceuașu de Câmpie, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Caucalidion*, *Convolvulo-Agropyron*, *Artemisietea*, *Dauco-Melilotion*; Th-TH, Euras; $2n=16$, D; $L_8T_xU_3R_xN_x$; entomophily, endozoochory.
173. *Onobrychis arenaria* (Kit.) DC. – Morești, *Cirsio-Bracypodion*, *Festucetalia valesiaca*; H, Euras (cont.); $2n=14$, 28, D-P; $L_7T_7U_2R_7N_x$; entomophily, epizoochory.
174. *Onobrychis viciifolia* Scop – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Bromion erecti*, *Arrhenatherion*, *Festucetalia valesiaca*; H, Euras; $2n=28$, P; $L_8T_xU_3R_xN_x$; entomophily, epizoochory.
175. *Ononis arvensis* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Porumbeni, Săbed, Sângiorgiu de Mureș, Sântana de Mureș, Târgu-Mureș, Ulieș, Zau de Câmpie; *Brometalia erecti*, *Molinio-Arrhenatheretea*; H, Euras (cont.); $2n=30$, 32, D; $L_8T_6U_4R_7N_2$; entomophily, autochory, endozoochory.
176. *Ononis spinosa* L. – Morești, Ulieș, Zau de Câmpie; *Festuco-Brometea*, *Cirsio-Brachypodion*, *Molinion*; Ch-H, Eur; $2n=30$, 32, D; $L_8T_6U_xR_xN_3$; entomophily, autochory, endozoochory.
177. *Oxytropis pilosa* (L.) DC. – Cozma, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Festucetalia valesiaca*; H, Euras (cont.); $2n=16$, D; $L_9T_6U_3R_7N_1$.
178. **Robinia pseudacacia* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; MPh, Adv-Am-N; $2n=20$, 22, D; entomophily, anemochory, endozoochory (sub-spontaneous).

179. *Tetragonolobus maritimus* (L.) Roth – Fărăgău, Ulieş; *Armerion maritimae*, *Caricion davallianae*, *Molinietalia*; H, Eur (centr.)-subMed; $2n=14$, D; $L_8T_7U_5R_xN_xS_2$.
180. *Trifolium alpestre* L. – Cozma, Moreşti, Ulieş; *Geranion sanguinei*, *Cirsio-Brachypodion*, *Quercetia pubescentis*; H, Eur (centr. & SE); $2n=16, 20$, D; $L_7T_xU_4R_xN_3$; entomophily, anemochory, endozoochory.
181. *Trifolium ambiguum* M. Bieb. – Fărăgău; *Festuco-Brometia*, *Festuco-Sedetalia*, *Quercetalia pubescentis-petraeae*; H, Cont. (Cauc-Anat-Pont-Taur-Getic); $2n=...$; $L_8T_6U_4R_x$.
182. *Trifolium arvense* L. – Cozma, Fărăgău, Săbed Lechincioara, Moreşti, Ulieş; *Corynephoretalia*, *Stellarietia mediae*; Th, Euras; $2n=14$, D; $L_8T_xU_3R_xN_1$; entomophily, autogamy, endozoochory.
183. *Trifolium campestre* Schreb. – Cozma, Fărăgău, Săbed; Lechincioara, Moreşti, Ulieş; *Koelerion-Corynephoretia*, *Arrhenatheretalia*, *Festuco-Brometia*; Th-TH, Eur; $2n=14$, D; $L_8T_xU_4R_xN_3$; entomophily, endozoochory, anemochory.
184. *Trifolium hybridum* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Molinio-Arrhenatheretia*, *Molinietalia*; H, Atl-Eur; $2n=16$, D $L_7T_xU_6R_xN_5$; autogamy, endozoochory.
185. *Trifolium medium* L. – Balda, Băla, Bozed, Ercea, Herghelia Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Genisto-Quercion*, *Quercetia pubescentis*, *Prunetalia*; H, Euras; $2n=80$, P; $L_7T_5U_5R_xN_3$; entomophily, endozoochory, mirmecochory.
186. *Trifolium michranthum* Viv. – Moreşti; *Festucion pseudovinae*, *Festuco-Brometia*; Th (TH), Atl-Med; $2n=14, 16$, D; $L_8T_xU_5R_xS_2$.
187. *Trifolium montanum* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festuco-Brometia*, *Cirsio-Brachypodion*, *Geranion sanguinei*, *Arrhenatheretalia*; H, Euras; $2n=16$, D; $L_7T_xU_3R_xN_2$; entomophily, endozoochory.
188. *Trifolium ochroleucon* Huds. – Săbed, Lechincioara, Moreşti, Ulieş; *Trifolio-Geranietia*, *Brometalia erecti*, *Origanetalia*; H, Eur (centr.); $2n=16$, D; $L_7T_5U_4R_7N_2$; entomophily, endozoochory.
189. *Trifolium pannonicum* Jacq. – Cozma, Fărăgău, Ulieş; *Trifolion medii*, *Cirsio-Brachypodion*, *Cynosurion*; H, Pont-Med; $2n=96, 130, 180$, P; $L_7T_5U_4R_5N_x$; entomophily, endozoochory.
190. *Trifolium pratense* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Şeulia, Târgu-Mureş, Săbed Ulieş, Zau de Câmpie; *Molinio-Arrhenatheretia*; H, Euras; $2n=14$, D; $L_8T_xU_xR_xN_x$; entomophily, endozoochory, mirmecochory.
191. *Trifolium repens* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Molinio-Arrhenatheretia*, *Cynosurion*, *Plantaginetia majoris*; H, Euras; $2n=32$, P; $L_8T_xU_xR_xN_7S_1$; entomophily, endozoochory.
192. *Trifolium rubens* L. – Târgu-Mureş; *Geranion sanguinei*, *Quercetalia pubescentis*, H, Eur (centr.); $2n=16$, D; $L_7T_6U_4R_xN_2$.
193. *Vicia cracca* L. – Cozma, Fărăgău, Herghelia Moreşti, Ulieş; *Molinio-Arrhenatheretia*, *Trifolion medii*; H, Euras; $2n=12, 14, 24$, D-P; $L_7T_xU_4R_xN_x$; entomophily, anemochory, endozoochory.
194. *Vicia dumetorum* L. – Moreşti, *Quercio-Fagetia*, *Trifolion medii*; H, Eur (centr.); $2n=12$, D; $L_6T_5U_5R_7N_4$; entomophily, autochory, endozoochory.
195. *Vicia grandiflora* Scop. – Ulieş; *Trifolion medii*, *Quercio-Fagetia*; Th, Eur (centr.); $2n=12, 14$, D; $L_7T_6U_4R_xN_x$; entomophily, anemochory, endozoochory.
196. *Vicia sepium* L. – Cozma, Fărăgău, Herghelia, Moreşti, Ulieş; *Trifolion medii*, *Arrhenatheretalia*, *Quercio-Fagetia*, *Prunetalia*; H, Euras; $2n=14$, D; $L_xT_xU_5R_7N_5$; entomophily, autochory, endozoochory.

197. *Vicia sylvatica* L. – Herghelia; *Fagetalia*, *Trifolion medii*; H, Euras; 2n=14, D; $L_7T_5U_5R_5N_x$; entomophily, autogamy, endozoochory.

MYRTALES

LYTHRACEAE

198. *Lythrum salicaria* L. – Band, Băla, Ceuașu de Câmpie, Câmpenița, Cozma, Ercea, Fărăgău, Glodeni, Herghelia, Porumbeni, Morești, Săbed, Târgu-Mureș, Ulieș, Voiniceni; *Phragmiti-Magnocaricetea*, *Molinietalia*, *Potentillo-Polygonetalia*, *Magnocaricion elatae*; H, Circ; 2n=50, 60, P; $L_7T_6U_8R_7N_xS_1$; entomophily, heterostyly, epizoochory.

ONAGRACEAE

199. *Circaea lutetiana* L. – Cozma, Herghelia; *Impatienti-Stachion*, *Fagetalia*, *Fraxinetalia*, *Alnion incanae*; G, Euras-Med; 2n=22, D; $L_4T_xU_6R_xN_7$; entomophily, epizoochory.
200. *Epilobium angustifolium* (L.) Scop. (*Chamaenerion angustifolium* (L.) Scop.) – Morești, Târgu-Mureș; *Calamagrostion arundinaceae*, *Carici-Epilobion angustifolii*, *Adenostyllion*; H, Circ; 2n=36, P; $L_8T_xU_5R_5N_8$; entomophily, anemochory, proterandry.
201. *Epilobium hirsutum* L. – Cozma, Fărăgău, Târgu-Mureș, Ulieș; *Calthion*, *Filipendulion*; H, Euras; 2n=18, 36, 54, P; $L_7T_5U_8R_xN_9S_1$; entomophily, autogamy, anemochory.
202. *Epilobium montanum* L. – Herghelia, Săbed, Târgu-Mureș; *Fagetalia*, *Atropetalia*, *Galio-Alliarion*; H, Euras; 2n=36, P; $L_4T_xU_5R_6N_6$; autogamy, anemochory.
203. *Epilobium palustre* L. – Cozma, Fărăgău, Herghelia, Săbed; *Magnocaricion elatae*, *Caricion lasiocarpae*, *Caricion fuscae*, *Cardamino-Montion*; H, Circ; 2n=36, P; $L_7T_xU_9R_xN_3$; entomophily, hydrochory, anemochory, autochory.
204. *Epilobium parviflorum* Schreb. – Morești, Ulieș; *Calthion*, *Filipendulion*, *Glycerio-Sparganion*; H, Euras; 2n=36, P; $L_7T_5U_9R_xN_5$; entomophily, autogamy, anemochory.
205. *Oenothera biennis* L. – Fărăgău, Târgu-Mureș; *Onopordetalia*, *Dauco-Sisymbrium*, *Melilotion*; TH, Adv (Am-N); 2n=14, D; $L_8T_6U_3R_x$; entomophily, proterandry, zoochory.

HALORAGALES

HALORAGACEAE

206. *Myriophyllum spicatum* L. – Fărăgău, *Nymphaeion*, *Potametalia*; Hh, Circ; 2n=42, P; $L_5T_xU_{12}R_7N_5$; anemophily, hydrochory, epizoochory.

ELAEAGNALES

ELAEAGNACEAE

207. **Elaeagnus angustifolia* L. – Ulieș; MPh, Asia (temp); 2n=28, P; (sub-spontaneous).
208. *Hippophaë rhamnoides* L. – Herghelia, Săbed, Ulieș; *Tamaricion*, *Salicion elaeagni*, Ph, Euras; 2n=24, D; $L_9T_5U_4R_7N_2$; anemophily, entomophily, endozoochory (ornithochory); (sub-spontaneous).

SAPINDALES

ACERACEAE

209. *Acer campestre* L. – Balda, Band, Bozed, Cozma, Fărăgău, Herghelia, Morești, Săbed, Sârmaș, Târgu Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Quercu-Fagetea*, *Rhamno-Prunetea*, *Quercetalia pubescentis*; MPh-mPh, Eur; 2n=26, D; $L_5T_6U_5R_7N_6$; entomophily, anemochory.
210. *Acer negundo* L. – Săbed; Ph, Adv (Am-N); 2n=26, D; sub-spontaneous.

- 211. *Acer platanoides*** L. – Cozma, Herghelia, Lechința, Săbed, Sărmășel, Târgu Mureş, Ulieş; *Quercu-Fagetea*, *Tilio-Acerion*; MPh, Eur; $2n=26, 39, D; L_5T_6U_xR_xN_x$; entomophily, anemochory.
- 212. *Acer pseudoplatanus*** – Sânger, Săbed; *Tilio-Acerion*, *Alnion incanae*, *Quercu-Fagetea*; Ph, Eur (centr.); $2n=52, P; L_5T_xU_6R_xN_7$.
- 213. *Acer tataricum*** L. – Balda, Băla, Bozed, Ercea, Fărăgău, Gladiş, Herghelia, Lechința, Ogra, Sânmărgăhita, Săbed, Sărmaş, Târgu Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Aceri-Quercion*, *Quercion pedunculiflorae*; MPh-mPh, Euras (cont.); $2n=26, D; L_4T_6U_4R_7N_x$; entomophily, anemochory.

STAPHYLEACEAE

- 214. *Staphylea pinnata*** – Band, Grindeni, Herghelia, Iernut, Lechința, Sânmărgăhita, Săbed, Sărmaş, Târgu-Mureş, Ulieş, Zau de Câmpie; *Berberidion*, *Tilio-Acerion*, *Quercu-Fagetea*; Ph, Eur (centr. &S); $2n=18, D; L_7T_6U_5R_7N_5$.

RUTALES

RUTACEAE

- 215. *Dictamnus albus*** L. – Balda, Band, Bozed, Cozma, Fărăgău, Grindeni, Herghelia, Miheşu de Câmpie, Moişa, Săbed, Târgu-Mureş, Zau de Câmpie; *Geranion sanguinei*; H, Eur (subMed); $2n=36, D; L_7T_6U_3R_7N_2$.

SIMAROUBACEAE

- 216. *Ailanthus altissima*** (Mill.) Swingle – Săbed; *Ailanthetum altissimae*; MPh, Adv (China); $2n=64, P$.

ANACARDIACEAE

- 217. *Cotinus coggygria*** Scop. – Săbed; *Orno-Cotinion*; Ph, Pont-Med; $2n=...; L_7T_8U_3R_7N_x$.

LINALES

LINACEAE

- 218. *Linum austriacum*** L. – Moreşti, Săbed, Ulieş; *Brometalia erecti*, *Festucion valesiaca*, *Dauco-Melilotion*, *Cirsio-Brachypodion*; H, Euras; $2n=18, 27, D; L_9T_xU_3R_xN_2$; entomophily, epizoochory, heterostyly.
- 219. *Linum catharticum*** L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Sântana de Mureş, Târgu-Mureş, Ulieş; *Molinietalia*, *Caricion davallianae*, *Cirsio-Brachypodion*; Th (TH), Eur; $2n=16, D; L_7T_5U_xR_xN_1$; entomophily, sometimes autogamy, epizoochory.
- 220. *Linum flavum*** L. – Band, Fărăgău, Herghelia, Săbed Moreşti, Târgu-Mureş, Ulieş, Zau de Câmpie; *Geranion sanguinei*, *Cirsio-Brachypodion*, *Fagetalia valesiaca*; H, Pont-Pan-Balc; $2n=30, D; L_8T_6U_4R_7N_3$; entomophily, sometimes autogamy, epizoochory.
- 221. *Linum hirsutum*** L. – Balda, Cheţani, Cozma, Fărăgău, Lechinţioara, Lechința de Mureş, Luduş, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festucion valesiaca*, *Festucetalia vaginatae*; H, Pont-Pan; $2n=16, D; L_7T_3U_3R_7N_2$; entomophily, sometimes autogamy, epizoochory.
- 222. *Linum perenne*** L. – Cozma, Fărăgău, Săbed Moreşti, Ulieş; *Seslerietalia*, *Cirsio-Brachypodion*, *Molinio-Arrhenatheretea*; H, Euras (cont.); $2n=18, D; L_7T_6U_3R_7N_2$; entomophily, epizoochory, heterostyly.

223. *Linum tenuifolium* L. – Morești, Săbed; *Bromion erecti*, *Stipo-Festucetalia pallentis*; H, subMed-centr. Eur; $2n=16, 18, D$; $L_9T_6U_3R_7N_8$.

GERANIALES

OXALIDACEAE

224. *Oxalis corniculata* L. – Cozma, Fărăgău, Ulieș; *Lolio-Plantaginion*, *Chenopodietalia albi*, *Stellarietalia mediae*; Th, Adv (Med); $2n=24, 44, 48, P$; $L_7T_xU_4R_xN_6$; autogamy, autochory.

GERANIACEAE

225. *Erodium cicutarium* (L.) L'Héritier – Band, Porumbeni, Săbed, Șeulia, Târgu-Mureș, Ulieș; *Veronico-Euphorbion*, *Panico-Setarion*, *Koelerio-Corynephorosetalia*, *Lolio-Plantaginion*; Th, Cosm; $2n=40, P$; $L_8T_xU_3R_xN_x$; entomophily, autogamy, autochory, endozoochory, epizoochory.
226. *Geranium columbinum* L. – Cozma, Ulieș; *Artemisietalia*, *Stellarietalia mediae*; Th, Euras; $2n=18, D$; $L_7T_6U_4R_7N_7$; entomophily, autogamy, endozoochory, autochory.
227. *Geranium palustre* L. – Fărăgău; *Filipendulion*, *Molinion*, *Salicion albae*; H, Euras (cont.); $2n=28, P$; $L_8T_5U_7R_7N_8$; entomophily, autogamy, hydrochory, endozoochory, proterandry.
228. *Geranium pratense* L. – Cozma, Fărăgău, Herghelia Ulieș; *Aegopodion podagrariae*, *Arrhenatherion*; H, Euras (cont.); $2n=28, P$; $L_8T_5U_5R_6N_7$; entomophily, autochory, proterandry.
229. *Geranium robertianum* L. – Băla, Cozma, Ercea, Herghelia, Morești, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Stipion calamagrostis*, *Galio-Urticetalia*, *Fagetalia*, *Tilio-Acerion*; Th, Cosm; $2n=32, P$; $L_4T_xU_xR_xN_7$; entomophily, autogamy, anemochory, endozoochory.
230. *Geranium sanguineum* L. – Cozma, Târgu-Mureș; *Stipion calamagrostis*, *Festuco-Brometalia*, *Geranion sanguinei*, *Prunetalia*, *Quercetalia pubescentis*, *Galio-Alliarion*; H, Eur; $2n=84, P$; $L_7T_6U_4R_7N_3$; entomophily, autogamy, autochory, proterandry.

POLYGALALES

POLYGALACEAE

231. *Polygala comosa* Schkuhr – Band, Fărăgău, Herghelia, Săbed Morești, Târgu-Mureș, Zau de Câmpie; *Brometalia erecti*, *Arrhenatherion*, *Festuco-Brometalia*; H, Eur; $2n=28-34, P$; $L_8T_5U_4R_7N_2$; entomophily, autogamy.
232. *Polygala major* Jacq. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș, Mureș, Zau de Câmpie; *Festucetalia valesiaca*, *Cirsio-Brachypodion*; H, Pont-Med; $2n=32, P$; $L_7T_5U_3R_7N_3$; entomophily.
233. *Polygala vulgaris* L. – Ulieș; *Cirsio-Brachypodion*, *Molinion*, *Arrhenatheretalia*; H (Ch), Eur; $2n=28, 32, 48, 56, 68, 70, P$; $L_7T_xU_4R_xN_2$; entomophily, anemochory, endozoochory, mirmecochory.

CELASTRALES

CELASTRACEAE

234. *Euonymus europaea* L. – Band, Cozma, Fărăgău, Glodeni, Herghelia, Săbed, Sărmaș, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni, Zau de Câmpie; *Rhamno-Prunetalia*, *Quercetalia*, *Aceri-Quercion*, *Ulmion*; Ph, Eur; $2n=64, P$; $L_6T_xU_5R_7N_3$; entomophily, endozoochory (ornithochory).

- 235. *Euonymus verrucosus*** Scop. – Balda, Band, Herghelia, Lechința, Săbed, Sărmaș, Târgu-Mureș, Voivodeni, Zau de Câmpie; *Rhamno-Prunetea*, *Quercu-Fagetea*, *Quercetea pubescentis*; Ph, SE-Eur; $2n=32$, P; $L_8T_6U_3R_7N_3$; entomophily, endozoochory (ornithochory).

RHAMNALES

RHAMNACEAE

- 236. *Frangula alnus*** Mill. – Band, Cozma, Fărăgău, Herghelia, Morești, Șeulia, Târgu-Mureș, Ulieș; *Franguletea*, *Alnion incanae*, *Fagetalia*; Ph, Euras; $2n=20$, 26, D; $L_6T_xU_5R_xN_3$; entomophily, autogamy, proterandry, endozoochory (ornithochory).
- 237. *Rhamnus catharticus*** L. – Band, Bozed, Herghelia, Săbed, Târgu-Mureș, Ulieș, Zau de Cîmpie; *Prunetalia*, *Quercetalia pubescentis*, *Berberidion*, *Aceri-Quercion*; Ph, Euras; $2n=24$, P; $L_7T_6U_4R_7N_x$; entomophily, endozoochory (ornithochory).
- 238. *Rhamnus saxatilis*** Jacq. ssp. *tinctorius* (Waldst. et Kit.) Nyman – Săbed; *Fraxino-Cotinetalia*, *Quercetalia pubescentis*; Ph, centr. Eur-Med; $2n=20$, 60, P; $L_7T_6U_3R_7N_2$; entomophily, endozoochory (ornithochory);

SANTALALES

LORANTHACEAE

- 239. *Loranthus europaeus*** Jacq. – Herghelia, Morești; *Quercu-Fagetea*, *Lathyro-Carpinion*; Ch-nPh, Eur; $2n=18$, D; $L_8T_6U_3$; entomophily, endozoochory.
- 240. *Viscum album*** L. – Vâsc de foioase; Cozma, Herghelia, Săbed, Șeulia, Târgu-Mureș; *Quercu-Fagetea*; Ch (nPh), Eur; $2n=20$, D; $L_8T_6U_x$; entomophily, endozoochory.

SANTALACEAE

- 241. *Thesium linophyllum*** L. – Cozma, Fărăgău; *Festucetalia valesiacae*, *Brometalia erecti*; G-H, Eur (centr.); $2n=24$, P; $L_8T_5U_3R_7N_2$.

EUPHORBIALES

EUPHORBIACEAE

- 242. *Euphorbia amygdaloides*** L. – Cozma, Săbed, Herghelia, Ulieș; *Fagetalia*; Ch, Eur (centr.)-subAtl-subMed; $2n=18$, 20, D-P; $L_4T_5U_5R_xN_6$; entomophily, autogamy, endozoochory, hydrochory.
- 243. *Euphorbia cyparissias*** L. – Cozma, Fărăgău, Herghelia, Săbed, Lechințioara, Morești, Ulieș; *Festuco-Brometea*; H, Euras; $2n=20$, 40, D-P; $L_8T_xU_3R_xN_3$; autochory, anthropochory.
- 244. *Euphorbia epithymoides*** L. (*Euphorbia polychroma* A. Kern.) – Herghelia, *Stipo-Festucetalia pallentis*, *Quercetea pubescentis*, *Geranion sanguinei*; H, centr. Eur-Balc; $2n=14$, 16, D; $L_6T_xU_3R_xN_2$; entomophily, autogamy, endozoochory, hydrochory.
- 245. *Euphorbia falcata*** L. ssp. *acuminata* (Lam.) Simonk. – Herghelia, *Centauretalia cyani*; Th, Adv (Med); $2n=16$, D; $L_7T_6U_4R_8N_4$; entomophily, autogamy, endozoochory, hydrochory.
- 246. *Euphorbia platyphyllos*** L. – Ulieș; *Stellarietalia mediae*, *Origanetalia*, *Festucetalia valesiacae*; Th, Eur (centr.); $2n=28$, 30, 36, P; $L_6T_6U_5R_7N_5$; entomophily, autogamy, endozoochory, hydrochory.
- 247. *Euphorbia salicifolia*** Host – Lechințioara, Morești, Ulieș; *Corynephorretalia*, *Festuco-Brometea*, *Bromo-Festucion pallentis*; H, Pont-Pan; $2n=36$, P; $L_7T_6U_4R_7N_3$; entomophily, zoochory.
- 248. *Euphorbia seguierana*** Neck. – Chețani; *Corynephorretalia*, *Festuco-Brometea*, *Bromo-Festucion pallentis*; H, Euras (cont.); $L_9T_7U_2R_7N_1$.

249. *Euphorbia serulata* Thuill. (*Euphorbia stricta* L.) – Herghelia; *Senecion fluvialis*, *Alno-Padion*, *Calystegion*; Th, Eur (cont.); $2n=14, 20, 28$, D-P; $L_9T_6U_5R_7$.
250. *Euphorbia virgata* Waldst. et Kit. – Herghelia, Ulieș; *Stellarietea mediae*, *Potentillo-Polygonetalia*, *Dauco-Melilotion*; H, Euras (cont.); $2n=20$, D; $L_9T_6U_4R_7N_4$; entomophily, autogamy, endozoochory, hydrochory.
251. *Mercurialis annua* L.- Șăulia; *Veronico-Euphorbion*, *Caucalidion*; T, Cosm; $2n=16, 32-112$, D-P; $L_7T_6U_4R_7N_8$.
252. *Mercurialis perennis* L. – Band, Cozma, Herghelia, Săbed, Șeulia, Târgu-Mureș, Ulieș; *Fagetalia*; G (H), Eur; $2n=42, 48, 64, 66, 80, 84$, P; $L_2T_xU_xR_xN_7$; anemophily, entomophily, endozoochory, mirmecochory.

CORNALES

CORNACEAE

253. *Cornus mas* L. – Band, Herghelia, Săbed, Șeulia, Târgu-Mureș, Voivodeni; *Quercetea pubescentis*, *Ulmenion*; mPh, Pont-Med; $2n=18$, D; $L_6T_6U_xR_7N_4$; entomophily, endozoochory (ornithochory).
254. *Cornus sanguinea* L. – Band, Cozma, Fărăgău, Herghelia, Lechința, Morești, Sânger, Săbed, Sărmaș, Târgu-Mureș, Ulieș, Zau de Câmpie; *Aceri-Quercion*, *Rhamno-Prunetea*, *Fagetalia*; mPh, Eur (centr.); $2n=22$, D; $L_6T_xU_xR_xN_x$; entomophily, endozoochory (ornithochory).

APIALES

ARALIACEAE

255. *Hedera helix* L. – Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Quercu-Fagetea*, *Fagetalia*; nPh-Ep, Atl-Med; $2n=48$, P; $L_4T_6U_5R_xN_x$; entomophily, endozoochory (ornithochory).

APIACEAE (UMBELLIFERAE)

256. *Aegopodium podagraria* L. – Cozma, Herghelia, Ulieș; *Aegopodion podagrariae*, *Alnion incanae*, *Lamio-Chenopodietalia*, *Phyteumo-Trisetion*; H (G), Euras; $2n=22, 42, 42, 44$, D-P; $L_5T_xU_6R_xN_8$; entomophily, endozoochory, autochory.
257. *Angelica sylvestris* L. – Cozma, Herghelia, Ulieș; *Convolvuletalia sepium*, *Arrhenatheretalia*, *Molinietalia*, *Calthion*, *Alnenion glutinosae-incanae*; H, Euras; $2n=22$, D; $L_7T_xU_8R_xN_x$; entomophily, anemochory, hydrochory, endozoochory.
258. *Anthriscus cerefolium* (L.) Hoffm. ssp. *trichosperma* (Schult.) Arcang. – Cozma, Herghelia, Săbed, Târgu-Mureș, Ulieș; *Galio-Alliarion*; Th, Pont-Med; $2n=18$, D; $L_6T_xU_5R_xN_9$; entomophily, proterandry, epizoochory.
259. *Anthriscus sylvestris* (L.) Hoffm. – Band, Herghelia, Morești, Târgu-Mureș; *Molinio-Arrhenatheretea*, *Arction*, *Aegopodium podagrariae*, *Galio-Alliarion*; H, Euras; $2n=16, 18$, D; $L_7T_xU_5R_xN_8$; entomophily, proterandry, endozoochory, epizoochory.
260. *Bifora radians* Bieb. – Ulieș; *Stellarietea mediae*, *Chenopodietea*; Th, Med; $2n=22$, D; $L_7T_7U_3R_7N_x$.
261. *Bupleurum falcatum* L. – Band, Cozma, Fărăgău, Herghelia, Lechințioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Geranion sanguinei*, *Cirsio-Brachypodion*, *Quercion pubescentis-sessiliflorae*; H, Eur-Alp; $2n=16$, D; $L_6T_5U_3R_6N_3$; entomophily, zoochory.
262. *Carum carvi* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Morești, Papiu Ilarian, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Cynosurion*, *Molinio-Arrhenatheretea*,

- Arrhenatheretalia*; TH, Euras; $2n=20, 22, D; L_8T_xU_5R_xN_6$; entomophily, proterandry, endozoochory.
263. *Chaerophyllum hirsutum* L. (*Chaerophyllum cicutaria* Vill.) – Herghelia; *Aegopodion podagrariae*, *Petasition officinalis*, *Adenostylion*, *Calthion*, *Alnenion glutinosae-incanae*, *Tilio-Acerion*; H, Eur-Centr.; $2n=22, D; L_6T_4U_8R_5N_7$; entomophily, proterandry, zoochory
264. *Conium maculatum* L. – Band, Cozma, Fărăgău, Moreşti, Rîciu, Târgu-Mureş, Ulieş; *Artemisietea*, *Arction*, *Stellarietea mediae*; Th-TH, Euras; $2n=16, 22, D; L_8T_6U_6R_xN_8$; entomophily, proterandry, epizoochory.
265. *Daucus carota* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Sântana de Mureş, Sâncraiu de Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Artemisietea*, *Arction*, *Stellarietea mediae*; TH-H, Euras; $2n=18, D; L_8T_xU_4R_xN_4$; entomophily, anemophily, zoochory.
266. *Eryngium campestre* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Porumbeni, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festuco-Brometea*, *Convolvulo-Agropyron*; H, Pont-Med; $2n=14, 28, D-P; L_9T_6U_3R_7N_x$; entomophily, proterandry, anemochory, epizoochory.
267. *Eryngium planum* L. – Băla, Cozma, Ercea, Fărăgău, Herghelia, Săbed, Moreşti, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festucion pseudovinae*, *Corynephorretalia*, *Arrhenatherion*; H, Euras; $2n=16, D; L_7T_xU_5R_xN_x$; entomophily, proterandry, anemochory, epizoochory.
268. *Falcaria vulgaris* Bernh. (*Falcaria sioides* Ascherson) – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Convolvulo-Agropyron*, *Caucalidion*, *Festucetalia valesiaca*; Th-H, Euras (subMed); $2n=22, D; L_8T_xU_3R_xN_3$; entomophily, anemochory.
269. *Ferulago sylvatica* (Besser) Reichenb. – Fărăgău, Lechincioara, Moreşti, Ulieş; *Geranion sanguinei*, *Jurineo-Euphorbinenion*; H, Pont-Med; $2n=...$; $L_7T_6U_5R_7N_3$.
270. *Heracleum sphondylium* L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Sântana de Mureş, Sâncraiu de Mureş, Târgu-Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Aegopodion podagrariae*, *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Fagetalia*; H, Euras; $2n=22, D; L_7T_xU_5R_xN_8$; entomophily, proterandry, anemochory, endozoochory.
271. *Laser trilobum* (L.) Borkh. – Fărăgău, Ulieş; *Lathyro-Carpinion*, *Aro-Carpinenion*, *Quercetea pubescentis*, *Geranion sanguinei*; H, Eur-SE; $2n=22, D; L_5T_6U_4R_7N_2$.
272. *Oenanthe aquatica* (L.) Poiret – Fărăgău, *Oenanthion aquaticae*, *Bidention*, *Phragmition*; Hh, Euras; $2n=22, D; L_7T_6U_{10}R_7N_5$; entomophily, epizoochory, autochory.
273. *Oenanthe silaifolia* Bieb. – Fărăgău; *Potentillo-Polygonetalia*; H, subMed-Med; $2n=22, D; L_8T_6U_9R_7N_5S_2$; entomophily, epizoochory, autochory.
274. *Pastinaca sativa* L. ssp. *urens* (Gren. et Godr.) Čelak – Band, Cozma, Fărăgău, Herghelia, Săbed, Ulieş; *Arrhenatherion*, *Dauco-Melilotion*; TH-H, Eur (centr.)-subMed; $2n=22, D; L_8T_6U_4R_7$; entomophily, proterandry.
275. *Peucedanum carvifolia* Vill. – Moreşti; *Geranion sanguinei*, *Arrhenatherion*, *Prunetalia*; H, Eur centr.; $2n=...$; $L_8T_6U_5R_xN_5$.
276. *Peucedanum cervaria* (L.) Lapeyr. – Cozma, Fărăgău, Moreşti, Săbed, Ulieş; *Geranion sanguinei*, *Cirsio-Brachypodion*, *Quercetea pubescentis*; H, Eur (cont.); $2n=22, D; L_8T_5U_3R_7N_3$; entomophily, proterandry.
277. *Peucedanum oreoselinum* (L.) Moench – Fărăgău, Lechincioara, Moreşti, Porumbeni, Târgu-Mureş; *Trifolio-Geranieta*, *Geranion sanguinei*, *Stipo-Festucetalia pallentis*, *Festucetalia valesiaca*; H, Eur-Cont.; $2n=22, D; L_6T_5U_3R_7N_2$; entomophily, proterandry, endozoochory.

278. *Peucedanum ruthenicum* M. Bieb. – Lechincioara, Săbed; *Festucetalia valesiaca*; H, E-Med.
279. *Pimpinella saxifraga* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festuco-Brometea*, *Cirsio-Brachypodion*, *Pinion*; H, Euras-subMed; $2n=40$, P; $L_8T_xU_4R_x$; entomophily, proterandry, endozoochory.
280. *Sanicula europaea* L. – Cozma, Fărăgău, Herghelia; *Fagetalia*, *Abieti-Piceion*; H, Euras; $2n=16$, D; $L_4T_xU_5R_xN_6$; entomophily, entomophily, epizoochory.
281. *Seseli annuum* L. – Morești, Săbed; *Cirsio-Brachypodion*, *Geranion sanguinei*, *Festuco-Brometea*; TH (Th-H), Eur-Cont; $2n=16, 22$, D; $L_8T_xU_3R_xN_2$; entomophily, proterandry.
282. *Seseli libanotis* (L.) Koch – Morești, *Seslerion rigidae*; H, Euras (cont.); $2n=22$, D; $L_7T_4U_3R_6N_2$; entomophily, endozoochory, epizoochory.
283. *Sium latifolium* L. – Fărăgău; *Magnocaricion*, *Phragmition*; H, Euras; $2n=20$, P; $L_7T_xU_{10}R_xN_8$; entomophily, hydrochory, endozoochory, autochory.

DILLENIALES

PAEONIACEAE

284. *Paeonia tenuifolia* L. – Zau de Câmpie; *Festucetalia valesiaca*, *Quercetalia pubescentis*; H; Cont (Relict xerothermic postglaciar); $2n=10$, D; $L_8T_8U_3R_8N_x$.

THEALES

HYPERICACEAE

285. *Hypericum elegans* Stephan ex Willd. – Cozma, Ulieș; *Geranion sanguinei*, *Festucetalia valesiaca*, *Quercetalia pubescentis*; H, Euras (cont.); $2n=32$, P; $L_7T_6U_3R_7N_2$; entomophily, autogamy, endozoochory.
286. *Hypericum maculatum* Cr. – Herghelia, Săbed, Zau de Câmpie; *Mulgedio-Aconitetea*, *Polygono-Trisetion*, *Phyteumo-Trisetion*, *Potentillo ternatae-Nardion*, *Filipendulion*; H, Euras; $2n=16$, D; $L_8T_5U_6R_6N_2$; entomophily, autogamy, endozoochory.
287. *Hypericum perforatum* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Koelerio-Corynephoretea*, *Festuco-Brometea*, *Potentillo ternatae-Nardion*, *Prunetalia*, *Atropion*, *Dauco-Melilotion*; H, Euras; $2n=32$, P; $L_7T_xU_4R_xN_x$; entomophily, autogamy, endozoochory.

VIOLALES

VIOLACEAE

288. *Viola ambigua* Waldst. et Kit. – Giuluș, Lechința, Voiniceni; *Festucion valesiaca*; H, Pont-Pan; $2n=40$, P; $L_7T_6U_3R_7N_3$.
289. *Viola arvensis* Murray – Band, Gornești, Târgu-Mureș; *Stellarietea mediae*, *Chenopodietalia albi*; T, Cosm; $2n=34$, D; $L_5T_xU_xR_xN_x$.
290. *Viola hirta* L. – Cozma, Herghelia, Săbed, Ulieș; *Trifolio-Geranietea*, *Quercetalia pubescentis*, *Berberidion*, *Cirsio-Brachypodion*, *Festuco-Brometea*; H, Euras; $2n=20$, P; $L_7T_6U_3R_7N_2$; entomophily, autogamy (cleistogamy), endozoochory, mirmecochory.
291. *Viola mirabilis* L. – Săbed; *Fagetalia*; H, Euras; $2n=20$, P; $L_4T_6U_4R_7N_x$; heterantie, flori normal deschise dar sterile și cleistogamy, mirmecochory.
292. *Viola odorata* L. – Band, Cozma, Morești, Săbed, Sânpaul, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Galio-Urticetea*, *Prunetalia*, *Lathyro-Carpinion*; H, Atl-Med; $2n=20$, P; $L_5T_6U_5R_xN_8$; entomophily, cleistogamy.

293. *Viola reichenbachiana* Jord. – Cozma, Herghelia, Săbed, Ulieş; *Quercu-Fagetea*, *Fagetalia*; H, Euras; $2n=20$, P; $L_4T_xU_5R_xN_6$; entomophily, autogamy, autochory, endozoochory, mirmecochory.
294. *Viola tricolor* L. – Cozma, Herghelia, Moreşti, Săbed, Şeulia, Ulieş; *Centauretalia cyani*, *Scleranthion annui*, *Corynephorretalia*, *Phyteumo-Trisetion*; Th-H, Euras; $2n=26$, D; $L_7T_xU_5R_xN_6$; entomophily, autogamy, autochory, endozoochory, mirmecochory.

CISTACEAE

295. *Helianthemum nummularium* (L.) Mill. ssp. *nummularium* – Fărăgău, Herghelia, Lechincioara, Moreşti, Ulieş; *Cirsio-Brachypodion*, *Asplenio-Festucion pallentis*, *Festucetalia valesiacae*; Ch-H, Eur; $2n=20$, D; $L_7T_5U_3R_7N_1$; autogamy, entomophily, proterogyny, anemochory;

CAPPARALES

BRASSICACEAE

296. *Alliaria petiolata* (Bieb.) Cavara et Grande – Band, Cozma, Pânet, Herghelia, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Quercion pedunculiflorae*, *Ulmion*, *Galio-Alliarion*, *Senecion fluviatilis*, *Fagetalia*; Th-TH, Euras; $2n=36, 42$, P; $L_5T_6U_5R_7N_9$; entomophily, autogamy, endozoochory.
297. **Armoracia rusticana* P. Gaertner – Band, Cozma, Fărăgău, Râciu, Sâncraiu de Mureş, Sînmărghita, Ulieş, Voiniceni; *Arction*, *Convolvuletalia sepium*; G(H), Adv (Eur-SE, Asia-V); $2n=32$, P; $L_8T_6U_5R_xN_9$; (sub-spontaneous).
298. *Barbarea vulgaris* R. Br. – Lechincioara; *Bidentetalia*, *Convolvuletalia sepium*, *Potentillion anserinae*, *Senecion fluviatilis*; TH-H, Euras; $2n=16$, D; $U_3, L_8T_xU_7R_xN_6$; entomophily, autogamy, endozoochory.
299. *Brassica elongata* Ehrh. ssp. *elongata* – Balda, Fărăgău, Hădăreni, Lechinţa, Lechincioara, Miheşu de Câmpie, Poarta, Săbed; *Agropyro-Kochion*, *Agropyretalia*; TH (H), Eur (centr. & V); $2n=22$, D; $L_9T_6U_4R_7N_5$.
300. *Brassica nigra* (L.) Koch – Cozma; *Chenopodion glauci*, *Stellarietea mediae*, *Senecion fluviatilis*; Th, Eur, Asia-V; $2n=16$, D; $L_8T_6U_8R_7N_7$.
301. *Bunias orientalis* L. – Ulieş; *Sysymbrietalia*, *Onopordetalia*; TH-H, Euras (cont.); $2n=14$, D; $L_7T_xU_4R_xN_5$; entomophily, autogamy, anemochory, epizoochory, autochory, anthropochory.
302. *Capsella bursa-pastoris* (L.) Medicus – Band, Ceuaşu de Câmpie, Cozma, Fărăgău, Herghelia, Moreşti, Porumbeni, Săbed, Sângiorgiu de Mureş, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Stellarietea mediae*, *Lolio-Plantaginion*; Th, Cosm; $2n=32$, P; $L_7T_xU_xR_xN_x$; autogamy, anemochory, anthropochory.
303. *Cardaminopsis arenosa* (L.) Hayek – Herghelia *Potentillion caulescentis*, *Thlaspietea*, *Arrhenatheretalia*; Th-TH, Eur (Centr.); $2n=16, 28, 32$, D-P; $L_7T_xU_4R_6N_2$; entomophily, autogamy, proterandry, anemochory;
304. *Cardaria draba* (L.) Desv. (*Lepidium draba* L.) – Cozma, Ulieş; *Stellarietea mediae*, *Convolvulo-Agropyron*, *Onopordetalia*, *Caucalidion*, *Sisymbrium*; H, Euras-Med; $2n=62, 64$, P; $L_8T_7U_3R_7N_4$; entomophily, autogamy, proteroginia, anemochory, mirmecochory.
305. *Crambe tataria* Sebeok – Balda, Cheţani, Cozma, Fărăgău, Frunzeni, Grindeni, Lechincioara, Luduş, Mădăraş, Moişa, Moreşti, Pogăceaua, Tăureni, Săbed, Zau de Câmpie; *Stipion lessingianae*, *Agropyro-Kochion*, *Festucion valesiacae*; H, Pont-Pan; $2n=30$, D $L_9T_6U_3R_7N_3$.

306. *Cardamine bulbifera* (L.) Cr. (*Dentaria bulbifera* L.) – Cozma; *Fagetalia*; G, C-Eur; $2n=96$, P; $L_3T_xU_5R_xN_6$.
307. *Descurainia sophia* (L.) Webb (*Sisymbrium sophia* L.) – Ulieș; *Sisymbrium*, *Chenopodium glauci*, *Caucalidion*; Th, Euras; $2n=28$, P; $L_7T_6U_4R_xN_6$; entomophily, autogamy, anemochory.
308. *Erophila verna* (L.) Chevall. (*Draba verna* L.) – Cozma, Fărăgău, Ulieș; *Alyso-Sedion*, *Koelerio-Corynephoretea*; Th, Eur; $2n=14-64$, D-P; $L_8T_6U_4R_xN_2$; autogamy, entomophily, anemochory, endozoochory.
309. *Erysimum cheiranthoides* L. – Săbed; *Chenopodium glauci*, *Bidention*, *Stellarietea mediae*, *Calystegion*; Th, Circ; $2n=16$, D; $L_7T_xU_5R_xN_7$; entomophily, autogamy, anemochory, anthropochory.
310. *Erysimum odoratum* Ehrh. – Band, Băla, Ercea, Fărăgău, Herghelia, Porumbeni, Săbed, Târgu-Mureș, Zau de Câmpie; *Stipo-Festucetalia pallentis*, *Quercetea pubescentis*, *Festucetalia valesiaca*; TH, Pont, $2n=32$, P; U2, $L_9T_xU_4R_xN_2$.
311. *Hesperis tristis* L. – Miheșu de Câmpie, *Festucion valesiaca*; H, Pont-Pan-Med; $L_8T_6U_4R_7N_3$.
312. *Lepidium campestre* (L.) R. Br. – Cozma, Fărăgău, Ulieș; *Veronico-Euphorbion*, *Sisymbrietalia*, *Chenopodietalia albi*; Th, Eur; $2n=16$, D; $L_7T_6U_4R_7N_6$; entomophily, autogamy, anemochory, anthropochory.
313. *Nasturtium officinale* R. Br. – Cozma; *Glycerio-Sparganion*, *Ranunculion fluvialis*, *Nasturtio-Glycerietalia*; Hh, Cosm; $2n=32$, P; $L_6T_5U_{11}R_7N_7$.
314. *Raphanus raphanistrum* L. – Band, Fărăgău, Săbed, Sâncraiu de Mureș, Târgu-Mureș, Ulieș, Voiniceni; *Chenopodietalia albi*; Th, Med (Cosm); $x=9$, $2n=18$, D; $L_7T_6U_xR_7N_5$; entomophily, anemochory, anthropochory.
315. *Rorippa amphibia* (L.) Besser (*Nasturtium amphibium* (L.) R. Br.) – Fărăgău; *Phragmiti-Magnocaricetea*, *Phragmition*, *Fraxinetalia*; Hh, Euras; $2n=16, 32$, D-P; $L_7T_6U_{10}R_7N_8$; entomophily, autogamy, hidro-epizoochory, autochory.
316. *Rorippa pyrenaica* (Lam.) Reichenb. – Fărăgău; *Arrhenatheretalia*; H, Eur; $2n=16$, D; U2, $L_8T_xU_5R_7N_6$; entomophily, autogamy, hidro-epizoochory, autochory.
317. *Sinapis arvensis* L. – Fărăgău, Ulieș; *Stellarietea mediae*, *Caucalidion*, *Sisymbrium*, *Veronico-Euphorbion*; Th, Euras; $2n=18$, D; $L_7T_6U_xR_xN_6$; entomophily, autogamy, anemochory, anthropochory.
318. *Sisymbrium officinale* (L.) Scop. – Band, Săbed, Târgu-Mureș, Ulieș; *Sisymbrium*, *Caucalidion*, *Arction*, *Lolio-Plantaginion*; Th, Euras; $2n=14$, D; $L_8T_xU_4R_xN_7$; autogamy (rar entomophily), zoochory, anthropochory.
319. *Thlaspi arvense* L. – Ulieș; *Sisymbrietalia*, *Centauretalia cyani*, *Caucalidion*; Th, Euras; $2n=14$, D; $L_6T_6U_5R_7N_7$; entomophily, autogamy, anemochory, epizoochory, anthropochory.
320. *Thlaspi perfoliatum* L. – Morești, Săbed; *Alyso-Sedion*, *Festuco-Brometea*, *Caucalidion*; Th, Euras; $2n=42, 70$, P; U2, $L_8T_6U_4R_7N_2$; entomophily, autogamy, anemochory, epizoochory, anthropochory.
321. *Trinia ramosissima* (Fisch. ex Trevir.) W. D. J. Koch – Fărăgău; *Festucion valesiaca*, *Danthonio-Brachypodion*, H, Pont-Pan-Balc; $2n=20$, D; $L_9T_6U_2R_7N_2$.

SALICALES

SALICACEAE

322. *Populus alba* L. – Cozma, Dileu Vechi, Luduș, Ulieș; *Salicion albae*, *Ulmenion*; MPh (mPh), Euras; $2n=38, 57$, D-P; $L_7T_xU_5R_xN_6$; anemophily, anemochory, autochory.

323. *Populus nigra* L. – Cozma, Fărăgău, Târgu-Mureş, Ulieş; *Salicetalia purpureae*, *Ulmenion*; MPh, Euras; 2n=38, D; $L_7T_6U_8R_7N_7$; anemophily, anemochory, autochory.
324. *Populus tremula* L. – Cozma, Fărăgău, Herghelia, Săbed, Sângeorgiu de Mureş, Târgu-Mureş, Ulieş; *Prunetalia*, *Sambuco-Salicion*, *Quercu-Fagetia*; MPh-mPh, Euras; 2n=19, 38, 57, D; $L_7T_xU_5R_xN_x$; anemophily, anemochory, autochory.
325. *Salix alba* L. – Band, Cozma, Fărăgău, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Salicetalia purpurea*, *Salicion albae*; MPh, Euras; 2n=76, P; $L_8T_6U_7R_xN_7$; entomophily, anemochory.
326. *Salix caprea* L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureş; *Sambuco-Salicion capreae*, *Quercu-Fagetia*; mPh, Euras; 2n=38, 76, D-P; $L_7T_xU_6R_xN_x$; entomophily, anemochory.
327. *Salix cinerea* L. – Cozma, Fărăgău, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Salicion cinereae*; mPh, Euras; 2n=76, P; $L_7T_xU_9R_xN_4$; entomophily, anemochory.
328. *Salix elaeagnos* Scop. (*Salix incana* Schrank) – Târgu-Mureş; *Salicion incanae*, *Salicion elaeagno-daphnoides*; mPh, Eur (centr.); 2n=38, D; $L_7T_5U_7R_5N_4$; entomophily, anemochory.
329. *Salix fragilis* L. – Band, Porumbeni, Săbed, Sântana de Mureş, Târgu-Mureş; *Salicetalia purpurea*, *Alnion incanae*; MPh-mPh, Euras; 2n=76, P; $L_5T_xU_8R_xN_6$; entomophily, anemochory.
330. *Salix purpurea* L. – Band, Sîncraiu de Mureş, Târgu-Mureş, Voiniceni; *Salicetalia purpureae*; mPh, Euras; 2n=38, D; $L_8T_xU_xR_xN_x$, 5; entomophily, anemochory.
331. *Salix rosmarinifolia* L. – Fărăgău; *Caricetalia davallianae*, *Molinion*; mPh, Euras; 2n=38, D; $L_8T_xU_8R_xN_8$.

CUCURBITALES

CUCURBITACEAE

332. *Bryonia alba* L. – Band; *Galio-Alliarion*, *Arction*, *Senecion fluviatilis*; H, Euras (cont.); 2n=20, D; $L_8T_7U_6R_7N_x$.
333. *Echinocystis lobata* (Michx.) Torr. et A. Gray (*Echinocystis echinata* Britton, Sterns et Poggenb.) – Sântana de Mureş; *Senecion fluviatilis*; Th, Adv; 2n=32, P; $L_7T_7U_9R_7N_8$.

MALVALES (COLUMNIFERAE)

TILIACEAE

334. *Tilia cordata* Mill. – Balda, Band, Cozma, Herghelia, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Lathyro-Carpinion*, *Galio-Carpinenion*; MPh, Eur; 2n=82, D; $L_7T_xU_xR_xN_5$; entomophily, anemochory.
335. *Tilia platyphyllos* Scop. – Herghelia, Săbed, Târgu-Mureş; *Fagetalia*, *Tilio-Acerion*; MPh, Eur (centr.); 2n=82, D; $L_7T_xU_5R_xN_7$; entomophily, anemochory.
336. *Tilia tomentosa* – **Bozed**, **Săbed**, Târgu-Mureş; *Aro-Carpinenion*, *Quercetia pubescentis*, *Fraxino-Cotinetalia*; **Ph**, **Balc-Pan**; **2n=82, D**; $L_7T_6U_4R_7N_5$.

MALVACEAE

337. *Alcea pallida* (Willd.) W. et K. (*Althaea pallida* W. et K.) – Moreşti; *Festucetalia valesiacae*; Pont; 2n=42, P; $L_7T_7U_3R_7N_3$.
338. *Althaea officinalis* – Band, Târgu-Mureş; *Potentillo-Polygonetalia*, *Bidention*, *Molinietalia*; H, Euras (cont.); 2n=42, P; $L_6T_6U_7R_7N_4S_2$.
339. *Hibiscus trionum* L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureş, Ulieş; *Amarantho-Chenopodion albi*, *Eragrostietalia*, *Sisymbrium*; Th, Euras; 2n=28, 56, P; $L_6T_xU_3R_7N_x$; entomophily.

340. *Lavathera thuringiaca* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Onopordion*, *Arction*, *Origanetalia*; H, Euras (cont.); 2n=40, 44, 46, P; $L_7T_6U_5R_7N_7$; entomophily, proterandry.
341. *Malva neglecta* Wallr. – Band, Cozma, Șeulia; *Sisymbrietalia*, *Malvion neglectae*, *Arction*; Th-TH, Euras; 2n=42, P; $L_7T_6U_5R_7N_9$.
342. *Malva sylvestris* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Șăușa, Târgu-Mureș, Ulieș; *Sisymbrietalia*, *Onopordetalia*; Th-TH, Euras; 2n=42, P; $L_8T_6U_4R_xN_8$; entomophily, autogamy, proterandry, endozoochory.

THYMELAEALES

THYMELAEACEAE

343. *Daphne mezereum* L. – Băla, Ercea, Herghelia, Târgu-Mureș, Ulieș; *Fagetalia*, *Athyrio-Piceetalia*; nPh, Euras; 2n=18, D; $L_4T_xU_5R_7N_5$; entomophily, endozoochory (ornithochory).

PRIMULALES

PRIMULACEAE

344. *Anagallis arvensis* L. – Band, Băla, Câmpenița, Ceuașu de Câmpie, Cozma, Ercea, Fărăgău, Porumbeni, Săbed, Sângiorgiu de Mureș, Sântana de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Caucalidion*, *Stellarietetea mediae*, *Chenopodietalia albi*; Th, Circ; 2n=40, P; $L_6T_6U_5R_xN_6$; entomophily, autogamy, anemochory, anthropochory.
345. *Lysimachia nummularia* L. – Cozma, Band, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș; *Molinio-Arrhenatheretea*, *Potentillo-Polygonetalia*, *Galio-Alliarion*; Ch, Euras, Adv-Am-N; 2n=32, 36, 43, 45, P; $L_4T_6U_6R_xN_1$; entomophily, autogamy, autochory, endozoochory.
346. *Lysimachia punctata* L. – Band, între Câmpenița și Săbed, Cozma, Târgu-Mureș; *Atropetalia*, *Filipendulion*, *Origanetalia*; H, Eur (Centr. & SE); 2n=30, P; $L_6T_xU_7R_xN_4$; autogamy, epizoochory.
347. *Lysimachia vulgaris* L. – Band, între Câmpenița și Săbed, Cozma, Târgu-Mureș; *Magnocaricion elatae*, *Filipendulion*, *Alnetea glutinosae*, *Molinion*, *Alnion glutinosae*; H-Hh, Euras; 2n=28, 56, 84, P; $L_6T_xU_8R_xN_x$; autogamy, hydrochory, epizoochory.
348. *Primula vulgaris* Huds. (*Primula acaulis* (L.) L. ssp. *acaulis*) – Săbed; *Fagetalia*, *Galio-Carpinenion*, *Prunetalia*; H, subMed; 2n=22, D; $L_5T_5U_5R_6N_5$.
349. *Primula elatior* – Herghelia; *Seslerion albicantis*, *Molinio-Arrhenatheretea*; H, Eur; 2n=22, D; $L_6T_4U_6R_5N_7$.
350. *Primula veris* L. em. Huds (*P. officinalis* (L.) Hill) – Band, Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Quercu-Fagetea*, *Quercion pubescentis sessiliflorae*, *Geranion sanguinei*; H, Euras; 2n=22, D; $L_7T_xU_4R_xN_3$; entomophily, anemochory, endozoochory.

GENTIANALES

GENTIANACEAE

351. *Centaurium erythraea* Rafn. – Band, Cozma, Fărăgău, Herghelia, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș; *Atropetalia*, *Origanetalia*, *Epilobietea angustifoli*, *Cynosurion*; Th, Eur (centr.); 2n=40, P; $L_8T_5U_5R_6N_x$; entomophily, anemochory, endozoochory.
352. *Centaurium pulchellum* (Sw.) Druce – Cozma; *Nanocyperion*; Th, Euras; 2n=34, 36, 38, 40, 42 D-P; $L_9T_6U_7R_7N_7S_5$.

353. *Gentiana cruciata* L. – Bozed, Cozma, Fărăgău, Moreşti, Săbed, Zau de Câmpie; *Brometalia erecti*, *Festuco-Brometea*; H, Euras; $2n=52$, P; $L_7T_xU_3R_7N_3$; entomophily, proterandry, endozoochory.

APOCYNACEAE

354. *Vinca herbacea* Waldst. et Kit. – Balda, Band, Bozed, Cheţani, Cozma, Fărăgău, Herghelia, Giuluş, Lechincioara, Luduş, Miheşu de Câmpie, Moişa, Moreşti, Porumbeni, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festucion valesiaca*; H, Pont; $2n=46$, D; $L_7T_6U_4R_7N_5$; entomophily, mirmecochory, autochory.
355. *Vinca minor* L. – Band, Cozma, Fărăgău, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Fagetalia*, *Lathyro-Carpinion*, *Prunetalia*; Ch, Eur (centr.)-Med; $2n=46$, D; $L_4T_6U_5R_xN_6$; entomophily, mirmecochory, autochory.

ASCLEPIADACEAE

356. **Asclepias syriaca* L. – Ulieş; H, Adv-Am-N; $2n=22$, D; L_8N_7 ; entomophily; (sub-spontaneous).
357. *Vincetoxicum hirundinaria* Medicus – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Stipion calamagrostis*, *Geranion sanguinei*, *Stipo-Festucetalia pallentis*, *Epipactido-Fagenion*, *Quercetea pubescentis*; H, Euras (cont.); $2n=22$, D; $L_6T_6U_3R_7N_3$; entomophily, anemochory.

RUBIALES

RUBIACEAE

358. *Asperula cynanchica* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festuco-Brometea*, *Quercetalia pubescentis*; H, Eur (centr.)-Med; $2n=20$, 44, D-P; $L_7T_xU_3R_xN_3$; entomophily, epizoochory.
359. *Cruciata glabra* (L.) Ehrend. – Cozma, Fărăgău, Moreşti, Ulieş; *Querco-Fagetea*, *Potentillo ternatae-Nardion*; H, Euras; $2n=22$, 44, D-P; $L_7T_6U_5R_6N_6$; entomophily, zoochory.
360. *Cruciata laevipes* Opiz – Băla, Cozma, Ercea Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Quercetea pubescentis*, *Galio-Alliarion*; H, Euras; $2n=22$, D; $L_7T_5U_6R_7N_7$; entomophily, epizoochory.
361. *Galium album* Mill. (*Galium erectum* Hudson) – Cozma, Fărăgău, Lechincioara, Moreşti, Ulieş; *Stipion calamagrostis*, *Trifolion medii*, *Arrhenateretalia*, *Arrhenatherion*, *Sambuco-Salicion*; H, Eur; $2n=44$, P; U2, $L_7T_xU_5R_xN_5$; entomophily, epizoochory.
362. *Galium aparine* L. – Band, Cozma, Fărăgău, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Artemisietea*, *Galio-Urticetea*, *Sambuco-Salicion*, *Convolvuletalia sepium*; Th, Circ; $2n=42$, 44, 48, 62, 66, 68, P; $L_7T_xU_6R_xN_9$; entomophily, autogamy, epizoochory.
363. *Galium glaucum* L. – Cozma, Lechincioara, Moreşti, Săbed, Ulieş; *Festuco-Brometea*, *Geranion sanguinei*; H, Eur (centr.)-subMed; $2n=44$, P; $L_7T_6U_4R_7N_x$; entomophily.
364. *Galium mollugo* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş; *Molinio-Arrhenatheretea*, *Trifolio-Geranietaea*, *Festuco-Brometea*; H, Euras; $2n=22$, D; $L_7T_xU_5R_xN_x$; entomophily, epizoochory.
365. *Galium odoratum* (L.) Scop. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Fagetalia*, *Impatienti-Stachyon sylvatici*, *Querco-Fagetea*; G, Euras; $2n=44$, P; $L_2T_xU_5R_xN_5$; entomophily, epizoochory.
366. *Galium rivale* (Sibth. et Sm.) Griseb. (*Asperula rivalis* Sibth. et Sm.) – Fărăgău; *Alnion incanae*, *Alno-Ulmion*, *Alnetea*; H, Euras (cont.); $2n=22$, 44, D-P; $L_6T_xU_8R_6$; entomophily, endozoochory.

367. *Galium rubioides* L. – Cozma, Fărăgău, Morești, Ulieș; *Quercetalia pubescentis*; H, Eur (centr.); $2n=66$, P; $L_5T_6U_7R_7N_x$; entomophily.
368. *Galium schultesii* Vest – Cozma, Herghelia, Săbed; *Galio-Carpinenion*; G, Eur(centr.); $2n=66$, P; U2, $L_5T_xU_4R_xN_4$; entomophily, epizoochory.
369. *Galium uliginosum* L. – Cozma, Fărăgău; *Molinietalia*, *Salicion cinereae*, *Salicetalia auritae*, *Caricetalia fuscae*; H, Euras; $2n=22, 44$, D-P; $L_6T_xU_8R_xN_x$; entomophily, epizoochory.
370. *Galium verum* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festuco-Brometea*, *Origanetalia*; H, Euras; $2n=22, 44$, D-P; $L_7T_5U_4R_7N_3$; entomophily, epizoochory.

DIPSACALES

CAPRIFOLIACEAE

371. *Lonicera xylosteum* L. – Band, Sânmărgăhita, Șeulia; *Querco-Fagetea*, *Abieti-Piceion*; Ph, Eur (centr.); $2n=18$, D; $L_5T_5U_5R_5N_x$
372. *Sambucus ebulus* L. – Band, Băla, Cozma, Ercea, Fărăgău, Glodeni, Morești, Săbed, Târgu-Mureș, Ulieș, Voivodeni, Voiniceni, Zau de Câmpie; *Lamio-Chenopodietalia*, *Atropion*; H, Euras (subMed); $2n=36$, P; $L_8T_6U_5R_7N_7$; entomophily, endozoochory (ornithochory).
373. *Sambucus nigra* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Atropetalia*, *Sambuco-Salicion*, *Prunetalia*; mPh-MPh, Eur; $2n=36$, P; $L_7T_xU_5R_xN_9$; entomophily, endozoochory (ornithochory).
374. *Viburnum lantana* L. – Cozma, Herghelia, Săbed, Ulieș; *Quercetalia pubescentis*, *Rhamno-Prunetea*, *Querco-Fagetea*, *Pinion*, *Berberidion*; mPh, Eur (subMed); $2n=18$, D; $L_6T_xU_4R_xN_5$; entomophily, autogamy, endozoochory (ornithochory).
375. *Viburnum opulus* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Săbed, Târgu-Mureș; *Rhamno-Prunetea*, *Alnion incanae*, *Prunetalia*; mPh, Circ; $2n=18$, D; $L_6T_xU_7R_7N_6$; entomophily, autogamy, endozoochory (ornithochory), autochory.

VALERIANACEAE

376. *Valeriana officinalis* L. – Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Adenostyletalia*, *Molinietalia*, *Filipendulion*, *Alnion incanae*; H, Euras-Med (subMed); $2n=14$, D; $L_7T_xU_7R_xN_5$; entomophily, anemochory.

DIPSACACEAE

377. *Cephalaria radiata* Griseb. et Schenk – Cozma, Fărăgău, Lechincioara, Săbed, Ulieș, Zau de Câmpie; *Festuco-Brometea*; H, End; $2n=...$; $L_7T_6U_3R_7$; entomophily.
378. *Cephalaria uralensis* (Murray) Roem. et Schult – Balda, Bosed, Herghelia, Lechința, Săbed; *Festucion valesiaca*, *Stipion lessingiana*; H, Pont-Balc; $2n=18$, D; $L_8T_6U_3R_7N_2$
379. *Dipsacus fullonum* L. – Cozma, Fărăgău, Ulieș; *Artemisietea*, *Lolio-Plantaginion*, *Onopordetalia*; TH, subMed; $2n=16, 18$, D; $L_9T_6U_6R_7N_5$; entomophily, proterandry, epizoochory.
380. *Dipsacus laciniatus* L. – Cozma, Fărăgău, Herghelia, Morești, Ulieș; *Artemisietea*, *Potentillo-Polygonetalia*, *Onopordetalia*; TH, Euras (cont.); $2n=16, 18$, D; $L_7T_7U_6R_7N_6$; entomophily, proterandry, epizoochory.
381. *Knautia arvensis* (L.) Coult. – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Trifolion medii*, *Arrhenatheretalia*, *Brometalia erecti*, *Festucion valesiaca*; H, Eur; $2n=20, 40, 43, 46$ D-P; $L_7T_xU_4R_xN_3$; entomophily, proterandry, mirmecochory, endozoochory.

- 382. *Scabiosa ochroleuca* L.** – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festuco-Brometea*, *Cirsio-Brachypodion*, *Festucetalia valesiacae*; H, Euras (cont.); $2n=16$, D; $L_8T_xU_3R_xN_3$; entomophily, proterandry, mirmecochory, endozoochory.

OLEALES

OLEACEAE

- 383. *Fraxinus excelsior* L.** – Band, Cozma, Herghelia, Lechința, Săbed, Sărmaş, Şeulia, Târgu-Mureş, Ulieş; *Alnion glutinosae*, *Quercu-Fagetalia*, *Tilio-Acerion*, *Alno-Fraxinetalia*; MPh, Eur; $2n=46$, D; $L_7T_xU_5R_xN_7$; autogamy, anemochory.
- 384. *Fraxinus ornus* L.** – Săbed; *Quercetalia pubescentis*, *Berberidion*, *Fraxino-Cotinetalia*; MPh; subMed; $2n=46$, D; $L_7T_8U_3R_8N_3$; autogamy, anemochory.
- 385. *Ligustrum vulgare* L.** – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Rhamno-Prunetea*, *Berberidion*, *Quercu-Fagetalia*; mPh, Eur (subMed); $2n=46$, D; $L_6T_6U_xR_7N_x$; entomophily, endozoochory.

SOLANALES

CONVOLVULACEAE

- 386. *Calystegia sepium* (L.) R. Br.** – Band, Cozma, Fărăgău, Herghelia, Moreşti, Oarba de Mureş, Petea, Râciu, Săbed, Târgu-Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Phragmiti-Magnocaricetea*, *Chenopodion glauci*, *Convolvuletalia sepium*, *Filipendulion*, *Salicion albae*, *Veronico-Euphorbion*; H, Euras; $2n=22, 24$, D; $L_8T_6U_6R_7N_9$; entomophily, autogamy, endozoochory, autochory.
- 387. *Convolvulus arvensis* L.** – Band, Băla, Cozma, Coasta Mare, Ercea, Fărăgău, Herghelia, Moreşti, Râciu, Săbed, Sântana de Mureş, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Stellarietea mediae*, *Convolvulo-Agropyron*, *Sisymbrium*, *Arction*; G (H), Cosm; $2n=50$, P; $L_7T_xU_4R_xN_x$; entomophily, autogamy, proterandry, proterogyny, heterostyly, cleistogamy, anemochory, endozoochory.

CUSCUTACEAE

- 388. *Cuscuta epithymum* (L.) L.** – Cozma, Fărăgău, Ulieş; *Festuco-Brometea*; Th, Euras; $2n=14$, D; $L_xT_6U_xR_xN_2$; entomophily, autogamy, anemochory, anthropochory.
- 389. *Cuscuta europaea* L.** – Band, Cozma, Fărăgău, Moreşti, Târgu-Mureş; *Convolvuletalia sepium*, *Senecion fluciatilis*; Th, Euras; $2n=14$, D; $L_xT_xU_7R_xN_7$; entomophily, autogamy, anemochory, anthropochory.

BORAGINALES

BORAGINACEAE

- 390. *Anchusa barbellieri* (All.) Vitm.** – Cozma, Grindeni, Herghelia, Moreşti, Săbed, Ulieş; *Festucion valesiacae*, *Jurineo-Euphorbinenion*; H, Pont-Med; $2n=16, 18$, D; $L_9T_6U_3R_7N_2$; entomophily, autogamy, mirmecochory.
- 391. *Anchusa officinalis* L.** – Band, Cozma, Fărăgău, Moreşti, Târgu-Mureş, Ulieş, Zau de câmpie; *Onopordetalia*, *Festucion valesiacae*, *Jurineo-Euphorbinenion*; H (TH), Eur; $2n=16$, D; $L_9T_6U_3R_7N_5$; entomophily, autogamy, heterostyly, mirmecochory.
- 392. *Buglossoides arvensis* (L.) M. Johnston** – Ulieş; *Centauretalia cyani*, *Convolvulo-Agropyron*, *Stellarietea mediae*; Th, Euras; $2n=16, 24, 28$, D; $L_7T_7U_xR_7N_5$; entomophily.
- 393. *Cerinth minor* L.** – Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Dauco-Melilotion*, *Onopordion*; Th-TH, Eur (centr.)-Med; $2n=18$, D; $L_8T_6U_4R_7N_4$; entomophily, anemochory, epizoochory.

394. *Cynoglossum officinale* L. – Band, Cozma, Târgu-Mureș; *Onopordetalia*, *Dauco-Melilotion*, *Convolvulo-Agropyron*; Th, Euras (cont.); $2n=24$, $L_8T_xU_3R_xN_8$
395. *Echium maculatum* L. – Balda, Fărăgău, Moişa, Săbed; *Festucion valesiaca*, *Jurineo-Euphorbinenion*, *Aceri-Quercion*; T, Pont-Pan; $2n=24$, P; $L_8T_7U_3R_7N_3$
396. *Echium vulgare* L. – Band, Băla, Cozma, Ercea, Fărăgău, Glodeni, Herghelia, Morești, Porumbeni, Rîciu, Săbed, Sâncraiu de Mureș, Sântana de Mureș, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni, Zau de Câmpie; *Onopordetalia*, *Caucalidion*, *Koelerio-Corynephoretea*, *Festuco-Brometea*; TH, Euras; $2n=16$, 32, D-P; $L_9T_xU_3R_xN_4$; entomophily, proterandry, anemochory, epizoochory, autochory.
397. *Buglossoides purpureocaerulea* (L.) I. M. Johnston (*Lithospermum purpureocaeruleum* L.) – Band, Herghelia, Lechința, Moişa, Săbed, Târgu-Mureș; *Quercetalia pubescentis*, *Berberidion*; H-G, Eur (centr.)-subMed; $2n=16$, D; U_2 , $L_5T_7U_4R_7N_4$; entomophily, proterogyny.
398. *Myosotis arvensis* (L.) Hill – Morești, Ulieș; *Stellarietalia mediae*, *Atropetalia*, *Arrhenatheretalia*; TH, Euras; $2n=52$, P; $L_7T_6U_4R_xN_6$; entomophily, autogamy, epizoochory.
399. *Myosotis scorpioides* L. – Cozma, Fărăgău, Ulieș; *Nasturtio-Glycerietalia*, *Calthion*, *Phragmition*; H, Euras; $2n=64$, 66, P; $L_7T_xU_8R_xN_5$; entomophily, hydrochory.
400. *Nonea pulla* (L.) DC. – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Festucion valesiaca*, *Convolvulo-Agropyron*, *Caucalidion*; H, Eur (centr.&SE); $2n=18$, 20, D; $L_7T_xU_3R_xN_2$; entomophily, mirmecochory.
401. *Pulmonaria mollis* Wulfen ex Hornem. – Band, Bozed, Herghelia, Săbed, Șăușă, Târgu-Mureș; *Origanetalia*, *Quercetalia pubescentis*, *Prunetalia*; H, Eur (centr.); $2n=18$, D; $L_6T_6U_5R_7N_x$
402. *Pulmonaria officinalis* L. – Cozma, Fărăgău, Herghelia, Săbed, Ulieș; *Fagetalia*, *Origanetalia*, *Berberidion*; H, Eur; $2n=14$, D; $L_5T_6U_5R_7N_6$; entomophily, heterostyly, endozoochory, mirmecochory.
403. *Symphytum officinale* L. – Band, Ceuașu de Câmpie, Cozma, Fărăgău, Herghelia, Morești, Porumbeni, Săbed, Sânmărghita, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Bidention*, *Molinietalia*, *Veronico-Euphorbion*, *Salicion albae*, *Alentea glutinosae*; H, Euras; $2n=36$, P; $L_7T_xU_8R_xN_8$; entomophily, autogamy, heterostyly, epizoochory, mirmecochory.
404. *Symphytum tuberosum* L. – Herghelia; *Fagetalia*; G, Eur (centr.); $2n=144$, P; $L_4T_5U_6R_6N_5$.

LAMIALES

VERBENACEAE

405. *Verbena officinalis* L. – Cozma, Fărăgău, Herghelia, Morești, Săbed, Sâncraiu de Mureș, Târgu-Mureș, Ulieș, Voiniceni; *Potentillo-Polygonetalia*, *Lolio-Plantaginion*, *Sisymbrietalia*; H, Cosm; $2n=14$, D; $L_9T_xU_4R_xN_6$; entomophily, autogamy, anemochory, epizoochory.

LAMIACEAE

406. *Acinos arvensis* (Lam.) Dandy – Cozma, Fărăgău, Herghelia, Săbed, Ulieș; *Koelerio-Corynephoretea*; H, Eur; $2n=18$, D; $L_9T_xU_3R_xN_1$; entomophily, autogamy, proterandry, ginodioecie, anemochory, epizoochory.
407. *Ajuga chamaepitys* (L.) Schreb. – Fărăgău, Herghelia, Lechincioara, Săbed, Ulieș; *Jurineo-Euphorbinenion*, *Caucalidion*; Th, Pont-Med; $2n=28$, P; $L_7T_7U_3R_7N_4$.
408. *Ajuga genevensis* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Festuco-Brometea*; H, Euras; $2n=32$, P; $L_8T_xU_4R_7N_2$; entomophily, proterandry, mirmecochory, endozoochory.

409. *Ajuga laxmannii* (Murray) Benth. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festucion vaesiaceae*, *Jurineo-Euphorbenion*, *Aceri-Quercion*, *Origanetalia*; H, Pont-Pan-Balc; $2n=62$, P; $L_7T_6U_2R_7$.
410. *Ajuga reptans* L. – Band, Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Arrhenatheretalia*; H, Eur; $2n=32$, P; $L_4T_xU_6R_xN_6$; entomophily, autogamy, proterandry, epizoochory.
411. *Ballota nigra* L. – Band, Curteni, Târgu-Mureş, Ulieş; *Arction*, *Stellarietea mediae*, *Balloto-Robinion*; H (Ch), Eur (centr.&NE); $2n=22$, D; $L_8T_6U_5R_xN_8$; entomophily, autogamy, proterandry, epizoochory.
412. *Clinopodium vulgare* L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed; *Origanetalia*; H, Circ; $2n=20$, P; $L_7T_xU_4R_7N_3$; entomophily, proterandry, ginodioecie, anemochory, epizoochory.
413. *Galeopsis speciosa* Mill. – Zabără; Fărăgău, Herghelia, Ulieş; *Atropetalia*, *Alnion incanae*, *Tilio-Acerion*, *Fagetalia*; Th, Euras; $2n=16$, D; $L_6T_xU_5R_xN_8$; entomophily, autogamy, epizoochory, endozoochory.
414. *Galeopsis tetrahit* L. – Cozma, Fărăgău, Herghelia, Ulieş; *Rumicion alpini*, *Stellarietea mediae*, *Aegopodion*, *Atropetalia*, *Fagetalia*, *Galeopsidion*; Th, Eur; $2n=16$, D; $L_7T_xU_5R_xN_7$; entomophily, autogamy, epizoochory, endozoochory.
415. *Glechoma hederacea* L. – Band, Băla, Cozma, Glodeni, Herghelia, Săbed, Sâncraiu de Mureş, Şeulia, Târgu-Mureş, Ulieş, Voiniceni, Voivodeni; *Lamio-Chenopodietalia*, *Trifolion medii*, *Potentillo-Polygonetalia*, *Alnion incanae*; H-Ch, Euras; $2n=18$, 36, D; $L_6T_6U_6R_xN_7$; entomophily, proterandry, endozoochory, epizoochory, mirmecochory, autochory.
416. *Glechoma hirsuta* W. et K. – Band, Herghelia, Săbed, Zau de Câmpie; *Lathyro-Carpinion*; H-Ch, Pont-Med-Centr.Eur; $2n=36$, P; $L_6T_xU_4R_5N_3$; entomophily, proterandry, endozoochory, epizoochory, mirmecochory, autochory.
417. *Lamiastrum galeobdolon* (L.) Crantz – Herghelia, Săbed, Ulieş; *Fagetalia*, *Athyrio-Piceetalia*; H (Ch), Eur (centr.); $2n=18$, D; $L_3T_xU_5R_xN_5$; entomophily.
418. *Lamium album* L. – Band, Băla, Ceuaşu de Câmpie, Câmpeniţa, Fărăgău, Glodeni, Herghelia, Porumbeni, Săbed, Şeulia, Târgu-Mureş, Sânmărghita, Cozma, Sâncraiu de Mureş, Sântana de Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Rumicion alpini*, *Arction*, *Lamio-Chenopodietalia*, *Galio-Alliarion*; H, Euras; $2n=18$, D; $L_7T_xU_5R_xN_9$; entomophily, autogamy, mirmecochory, endozoochory, autochory.
419. *Lamium maculatum* L. – Herghelia, Moreşti, Săbed; *Lamio-Chenopodietalia*, *Fagetalia*, *Alnion incanae*, *Arction*; H (Ch), Euras; $2n=18$, D; $L_4T_xU_6R_xN_8$; entomophily, mirmecochory, endozoochory, autochory.
420. *Lamium purpureum* L. – Cozma, Fărăgău, Ulieş; *Stellarietea mediae*, *Arction*; Th (H), Euras; $2n=18$, D; $L_7T_xU_5R_xN_x$; entomophily, autogamy, proterandry, mirmecochory.
421. *Leonurus cardiaca* L. – Band, Cozma, Fărăgău, Sângeorgiu de Mureş, Târgu-Mureş, Ulieş, Zau de Câmpie; *Artemisietea*, *Stellarietea mediae*; H, Euras; $2n=18$, D; $L_7T_6U_5R_7N_9$; entomophily, autogamy, proterandry, epizoochory.
422. *Lycopus europaeus* L. – Fărăgău, Ulieş; *Phragmitetalia*, *Veronico-Euphorbion*, *Senecion fluviatilis*, *Bidention*; H, Euras; $2n=22$, D; $L_7T_6U_9R_xN_7$; entomophily, proterandry, hydrochory, epizoochory.
423. *Marrubium vulgare* L. – Ulieş; *Onopordetalia*; H, Euras; $2n=34$, D; $L_7T_7U_3R_7N_8$; entomophily.
424. *Melissa officinalis* L. – Târgu-Mureş; H, Med; Cultivated and sub-spontaneous;

425. *Melittis melissophyllum* L. – Cozma, Săbed, Ulieș; *Quercetalia pubescentis-petraeae*, *Farxino-Cotinion*; H, Eur (centr.&V); 2n=30, D; $L_5T_6U_4R_7N_3$; entomophily, proterandry, mirmecochory.
426. *Mentha aquatica* L. – Band, Fărăgău, Săbed, Târgu-Mureș; *Phragmitetalia*, *Caricenion gracilis*, *Bidention*, *Potentillo-Polygonetalia*; H-Hh, Eur; 2n=96, P; $L_7T_6U_9R_7N_4$; entomophily, proterandry, hydrochory, endozoochory, epizoochory.
427. *Mentha arvensis* L. – Fărăgău, Morești, Târgu-Mureș, Ulieș; *Stellarietia mediae*; H-G, Circ; 2n=24, 72, 90, P; $L_xT_xU_8R_xN_x$; entomophily, proterandry, hydrochory, endozoochory, epizoochory.
428. *Mentha longifolia* (L.) Hudson – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Nasturtio-Glycerietalia*, *Rumicion alpini*, *Filipendulion*, *Potentillion anserinae*, *Convolvuletalia sepium*; H, Euras; 2n=24, P; $L_7T_xU_8R_xN_8$; entomophily, proterandry, hydrochory, endozoochory, epizoochory.
429. *Mentha pulegium* L. – Târgu-Mureș; *Isoëto-Nanojuncetia*, *Potentillo-Polygonetalia*, *Puccinelieta*; H, Euras (submed); 2n = 20, P; $L_8T_6U_7R_xN_xS_3$
430. *Mentha spicata* L. ssp. *spicata* – Herghelia; *Alnion incanae*, *Alno-Ulmion*; H, Atl-Med; 2n=48, P; cultivated and sub-spontaneous.
431. *Mentha x verticillata* L. (*M. aquatica* x *M. arvensis*) – Fărăgău; H, Eur; entomophily, proterandry, hydrochory, endozoochory, epizoochory.
432. *Nepeta ucranica* L. – Zau de Câmpie; *Stipion lessingiana*; H, Cont; 2n=36, P; $L_8T_7U_4R_7N_7$; entomophily, proterandry, anemochory, autochory.
433. *Nepeta nuda* L. (*Nepeta pannonica* L.) – Cozma, Fărăgău, Herghelia, Lechincioara, Lechința de Mureș, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Stipion lessingiana*, *Aceri-Quercion*, *Onopordion*; H-Ch, Euras (cont.); 2n=18, D; $L_8T_xU_3R_7N_x$; entomophily, proterandry, anemochory, autochory.
434. *Origanum vulgare* L. – Cozma, Fărăgău, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Stipion calamagrostis*, *Origanetalia*, *Cirsio-Brachypodion*, *Prunion spinosae*, *Quercetia pubescentis*; H, Euras; 2n=30, D; $L_7T_xU_3R_xN_3$; entomophily, proterandry, anemochory, autochory.
435. *Phlomis tuberosa* L. – Băla, Bozed, Ceuașu de Câmpie, Ercea, Fărăgău, Herghelia, Luduș, Morești, Săbed, Tăureni, Ulieș; *Geranion sanguinei*, *Festucion valesiaca*, *Jurineo-Euphorbinenion*, *Quercion pedunculiflorae*, *Aceri-Quercion*; H, Euras (cont.); 2n=22, D; $L_8T_6U_4R_7N_7$; entomophily.
436. *Prunella grandiflora* (L.) Scholler – Fărăgău, Morești, Săbed; *Cirsio-Brachypodion*, *Brometalia erecti*; H, Eur; 2n=28, P; $L_7T_xU_3R_xN_3$; entomophily, proterandry, endozoochory, epizoochory.
437. *Prunella laciniata* (L.) L. – Cozma, Fărăgău, Săbed, Ulieș; *Festuco-Brometia*, *Geranion sanguinei*; H, Eur (centr.)-Med; 2n=28, 32, P; $L_7T_xU_4R_7N_2$; entomophily, proterandry, endozoochory, epizoochory.
438. *Prunella vulgaris* L. – Cozma, Fărăgău, Herghelia, Săbed, Ulieș; *Molinio-Arrhenatheretia*, *Cynosurion*, *Brometalia erecti*, *Lolio-Plantaginion*; H, Cosm; 2n=28, P; $L_7T_xU_xR_xN_x$; entomophily, autogamy, proterandry, endozoochory, epizoochory.
439. *Salvia austriaca* Jacq. – Fărăgău, Lechincioara, Morești, Săbed, Ulieș; *Festucion valesiaca*; H, Pont-Pan; 2n=18, 20, D; $L_8T_6U_3R_7N_3$; entomophily, proterandry, epizoochory.
440. *Salvia glutinosa* L. – Herghelia; *Fagetalia*, *Impatiens-Stachyion*; H, Euras; 2n=16, D; U3, $L_4T_5U_6R_5N_7$; entomophily, proterandry, epizoochory.

441. *Salvia nemorosa* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Convolvulo-Agropyrion*, *Festucion valesiacae*, *Quercetalia pubescentis*; H, Pont-Med-Eur (centr.); $2n=12$, D; $L_7T_xU_4R_xN_4$; entomophily, proterandry, epizoochory.
442. *Salvia nutans* L. – Bozed, Fărăgău, Lechincioara, Luduş, Săbed, Ulieş; *Stipion lessingianae*; H, Pont-Pan; $2n=18$, 22, D; $L_9T_6U_1R_7N_1$; entomophily, proterandry, epizoochory.
443. *Salvia pratensis* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festuco-Brometea*; H, Eur (subMed); $2n=18$, D; $L_8T_xU_4R_xN_4$; entomophily, proterandry, epizoochory.
444. *Salvia transsylvanica* (Schur ex Griseb.) Schur – Balda, Bozed, Cheţani, Fărăgău, Miheşu de Câmpie, Săbed, Ulieş, Zau de Câmpie; *Stipion lessingianae*; H, End; $2n=...$; $L_8T_6U_3R_7N_3$; entomophily, proterandry, epizoochory.
445. *Salvia verticillata* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Convolvulo-Agropyrion*, *Festuco-Brometea*, *Onopordion*; H, Eur (centr.)-Med; $2n=16$, D; $L_9T_xU_4R_xN_5$; entomophily, proterandry, epizoochory.
446. *Scutellaria galericulata* L. – Fărăgău; *Magnocaricion elatae*, *Molinietalia*; H, Circ; $2n=32$, P; $L_7T_6U_9R_7N_6$; entomophily, proterandry, anemochory, epizoochory, autochory.
447. *Scutellaria hastifolia* L. – Ulieş; *Potentillo-Polygonetalia*, *Molinietalia*; H, Eur; $2n=32$, P; $L_7T_7U_8R_7N_5$; entomophily, proterandry, anemochory, epizoochory, autochory.
448. *Stachys annua* (L.) L. – Cozma, Săbed, Ulieş; *Centauretalia cyani*, *Amarantho-Chenopodion albi*, *Caucalidion*; Th, E-Med; $2n=34$, P; $L_7T_6U_3R_7N_4$; entomophily, autogamy, proterandry.
449. *Stachys germanica* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Festuco-Brometea*, *Geranion sanguinei*, *Onopordion*; H, Pont-Med; $2n=30$, P; $L_7T_6U_3R_7N_x$; entomophily, proterandry, epizoochory.
450. *Stachys officinalis* (L.) (*Betonica officinalis* L.) – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Molinietalia*, *Molinion*, *Origanetalia*; H, Euras; $2n=16$, D; $L_7T_6U_xR_xN_8$; entomophily, autogamy, proterandry, endozoochory, epizoochory, anemochory.
451. *Stachys recta* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festuco-Brometea*, *Festucetalia valesiacae*, *Cirsio-Brachypodion*, *Geranion sanguinei*; H, Pont-Med & Eur (centr.); $2n=34$, P; $L_7T_xU_3R_7N_2$; entomophily, proterandry.
452. *Stachys sylvatica* L. – Cozma, Herghelia, Ulieş; *Impatienti-Stachyion silvaticae*, *Petasition officinalis*, *Atropion*, *Fagetalia*, *Alnion-incanae*; H, Euras, $2n=66$, P; $L_4T_xU_7R_xN_7$; entomophily, autogamy, epizoochory, anemochory.
453. *Teucrium chamaedrys* L. – Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Porumbeni, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Geranion sanguinei*, *Festuco-Brometea*, *Quercetalia pubescentis*; Ch, Eur (centr.)-subMed; $2n=32$, 62, 96, P; $L_7T_6U_2R_7N_1$; entomophily, proterandry, anemochory.
454. *Teucrium montanum* L. – Moreşti, Săbed; *Stipion calamagrostis*, *Festuco-Brometea*, *Thymio-Festucion rupicola*; Ch, Eur (centr.)-Med; $2n=60$, P; $L_8T_5U_4R_7N_2$.
455. *Thymus glabrescens* Willd. – Band, Cozma, Fărăgău, Moreşti, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festuco-Brometea*; Ch, Pont (centr.) & Eur-Med; $2n=28$, 32, 56, 58, P; $L_8T_6U_3R_6N_3$; entomophily, proterandry, ginodioecie, endozoochory, mirmecochory.
456. *Thymus pannonicus* All. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Festucetalia valesiacae*, *Festucion valesiacae*; Ch, Euras (cont.); $2n=28$, P; $L_8T_6U_2R_7N_2$; entomophily, proterandry, ginodioecie, endozoochory, mirmecochory.

457. *Thymus pulegioides* L. – Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș; *Arrhenatheretalia*; Ch, Eur (mont.); $2n=28, 30, D-P$; $L_8T_xU_4R_xN_1$; entomophily, proterandry, ginodioecie, endozoochory, mirmecochory.

SOLANALES

SOLANACEAE

458. *Datura stramonium* L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Sâncraiu de Mureș, Târgu-Mureș, Ulieș; *Sisymbrietalia*, *Onopordion*, *Stellarietea mediae*; Th, Adv-Am-N (Cosm); $2n=24, P$; $L_8T_7U_4R_xN_8$.
459. *Hyoscyamus niger* L. – Band, Cozma, Târgu-Mureș; *Onopordetalia*, *Stellarietea mediae*; H, Euras; $2n=34, D$; $L_8T_6U_4R_7N_9$.
460. *Lycium barbarum* L. – Cozma, Ulieș; *Arction*, *Prunion spinosae*; mPh, China; $x=6, 2n=24, P$; $L_9T_7U_5R_7N_4$.
461. *Physalis alkekengi* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Sântana de Mureș, Târgu-Mureș; *Ulmenion*, *Prunetalia*; H, Adv (Am-N); $2n=24, D$; $L_5T_6U_6R_7N_7$; entomophily, autogamy, anemochory, endozoochory, autochory.
462. *Solanum dulcamara* L. – Band, Cozma, Fărăgău, Glodeni, Herghelia, Pânet, Râciu, Săbed, Sântana de Mureș, Târgu-Mureș, Voiniceni; *Artemisietea*, *Phragmition*, *Alnetea glutinosae*, *Alnion incanae*, *Senecion fluviatilis*; Ch, Euras; $x=6, 2n=24, P$; $L_7T_xU_9R_xN_8$; entomophily, endozoochory.
463. *Solanum nigrum* L. – Cozma, Fărăgău, Ulieș; *Caucalidion*, *Stellarietea mediae*; Th, Cosm; $2n=72, P$; $L_7T_6U_5R_7N_8$; entomophily, endozoochory, anthropochory.

SCROPHULARIALES

SCROPHULARIACEAE

464. *Digitalis grandiflora* Mill. – Band, Cozma, Fărăgău, Morești, Ulieș, Zau de Câmpie; *Calamagrostietalia villosae*, *Geranion sanguinei*; H, Eur (centr.); $2n=56, P$; $L_7T_5U_5R_5N_5$; entomophily, autogamy, proterandry, anemochory.
465. *Euphrasia rostkoviana* Hayne – Cozma, Morești, Săbed, Ulieș; *Molinio-Arrhenatheretea*, *Bromion erecti*; Th, Circ; $2n=22, D$; $L_7T_xU_5R_5N_3$; entomophily, proterogyny, endozoochory.
466. *Euphrasia stricta* D. Wolf – Cozma, Fărăgău, Herghelia, Morești, Târgu-Mureș; *Arrhenatheretalia*, *Festucion valesiacae*, *Koelerio-Corynephoretea*; Th, Eur; $2n=44, P$; $L_8T_xU_4R_xN_2$; entomophily, proterogyny, endozoochory.
467. *Linaria vulgaris* Mill. – Band, Cozma, Fărăgău, Morești, Săbed, Târgu-Mureș, Ulieș, Zau de Câmpie; *Caucalidion*, *Dauco-Melilotion*, *Onopordion*; H, Euras; $2n=12, D$; $L_8T_xU_3R_xN_3$; entomophily, anemochory, endozoochory, autochory.
468. *Melampyrum arvense* L. – Cozma, Fărăgău, Săbed, Ulieș; *Caucalidion*, *Geranion sanguinei*, *Bromion erecti*, *Jurineo-Euphorbinenion*; Th, Eur; $2n=18, D$; $L_7T_6U_3R_7N_3$; entomophily, autogamy, endozoochory, mirmecochory.
469. *Melampyrum barbatum* Waldst. et Kit. – Fărăgău; *Stellarietea mediae*, *Festucetalia valesiacae*; Th, Pan; $2n=...$; $L_7T_6U_4R_7N_x$; entomophily, autogamy, endozoochory, mirmecochory.
470. *Melampyrum cristatum* L. – Fărăgău, Herghelia, Morești, *Geranion sanguinei*, *Quercetalia pubescentis*; Th, Euras; $2n=18, D$; $L_6T_6U_xR_7N_3$; entomophily, autogamy, endozoochory, mirmecochory.
471. *Melampyrum bihariense* A. Kern. – Cozma, Fărăgău, Herghelia, Ulieș; *Lathyro-Carpinion*, *Lathyro-Carpinenion*; Th, Dac; $2n=...$; $L_5T_5U_5R_6N_x$; entomophily, autogamy, endozoochory, mirmecochory.

472. *Melampyrum pratense* L. – Săbed; *Genisto-Quercion*, *Piceetalia*; Th, Euras; $2n=18$, D; $L_x T_x U_5 R_4 N_3$; entomophily, autogamy, endozoochory, mirmecochory.
473. *Odontites vernus* (Bell.) Dumort – Fărăgău, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Caucalidion*, *Cynosurion*, *Lolio-Plantaginion*; Th, Euras (subMed); $2n=40$, P; $L_8 T_6 U_3 R_x$; entomophily, autogamy, anemochory, endozoochory.
474. *Rhinanthus angustifolius* C. C. Gmel. (*Rhinanthus glaber* Lam.; *Rhinantus major* Ehrh.) – Moreşti, Săbed; *Molinio-Arrhenatheretea*; Th, Euras; $2n=22$, D; $L_8 T_5 U_6 R_6 N_2$; entomophily, autogamy, anemochory, endozoochory.
475. *Rhinanthus rumelicus* Velen. – Cozma, Fărăgău, Moreşti, Ulieş; *Arrhenatheretalia*; Th, Pont-Pan-Balc; $2n=...$; $L_7 T_x U_5 R_x N_3$; entomophily, autogamy, anemochory, endozoochory.
476. *Scrophularia nodosa* L. – Band, Herghelia, Săbed, Ulieş; *Fagetalia*, *Lamio-Chenopodietalia*; H, Euras; $2n=36$, P; $L_4 T_6 U_6 R_6 N_7$; entomophily, autogamy, proterogyny, anemochory, epizoochory.
477. *Scrophularia scopolii* Hoppe – Band, Zau de Câmpie; *Adenostyletalia*, *Galio-Alliarion*, *Fagetalia*, *Aegopodion*; H, Pont-Pan-Balc; $2n=36$, P; $L_6 T_x U_7 R_x N_x$.
478. *Verbascum chaixii* Vill. ssp. *austriacum* (Schott) Hayek (*Verbascum austriacum* Schott) – Fărăgău; TH-H, Centr.&E-Eur; $2n=26$, 36, P; $L_8 T_6 U_4 R_7$; entomophily, anemochory, endozoochory.
479. *Verbascum lychnitis* L. – Cozma, Fărăgău; *Trifolio-Geranietea*, *Festuco-Brometea*, *Geranion sanguinei*; TH, Eur; $2n=26$, 32, 34, P; $L_7 T_x U_3 R_x N_8$; entomophily, anemochory, endozoochory.
480. *Verbascum nigrum* L. – Cozma, Săbed; *-Epilobietalia*, *Atropetalia*, *Arction*; TH-H, Euras; $2n=30$, D; $L_7 T_x U_5 R_x N_7$; entomophily, anemochory, endozoochory.
481. *Verbascum phlomoides* L. – Band, Herghelia, Moreşti, Porumbeni, Săbed, Târgu-Mureş, Zau de Câmpie; *Artemisietea*, *Stellarietea mediae*; TH, Eur-Centr-SE; $2n=32$, 34, P; $L_8 T_6 U_4 R_7 N_6$; entomophily, anemochory, endozoochory.
482. *Verbascum phoeniceum* L. – Band, Moreşti, Săbed, Târgu-Mureş, Ulieş; *Festucetalia valesiaca*; H, Euras (cont.); $2n=32$, 36, P; $L_7 T_6 U_3 R_7 N_2$; entomophily, anemochory, endozoochory.
483. *Veronica anagallis-aquatica* L. – Cozma, Ulieş; *Phragmiti-Magnocaricetea*, *Glycerio-Sparganion*, *Bidention*; H, Circ; $2n=18$, 36, D; $L_7 T_x U_9 R_x N_7$; entomophily, anemophily, hydrochory, epizoochory.
484. *Veronica arvensis* L. – Band, Şeulia, Târgu-Mureş, Voiniceni; *Stellarietea mediae*, *Koelerio-Corynephoretea*, *Arrhenatheretalia*; T, Euras; $2n=14$, 16, D; $L_6 T_6 U_5 R_7 N_x$.
485. *Veronica beccabunga* L. – Cozma, Fărăgău, Sâncraiu de Mureş, Târgu-Mureş, Ulieş; *Cardamino-Montion*, *Nasturtio-Glycerietalia*; H, Euras; $2n=18$, 36, D; $L_7 T_x U_{10} R_x N_6$; hydrochory, epizoochory.
486. *Veronica chamaedrys* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Trifolion medii*, *Arrhenatheretalia*, *Fagetalia*; H-Ch, Euras; $2n=32$, P; $L_6 T_x U_x R_x N_x$; entomophily, mirmecochory, endozoochory.
487. *Veronica officinalis* L. – Săbed; *Calamagrostio-Fagenion*, *Pino-Quercion*, *Dicrano-Pinion*, *Potentillo ternatae-Nardion*; Ch, Euras; $2n=18$, 36, 34, D-P; $L_5 T_x U_4 R_5 N_3$; entomophily, mirmecochory, endozoochory.
488. *Veronica persica* Poir. – Târgu-Mureş, Ulieş; *Stellarietea mediae*; Th, Adv (Asiat SV); $2n=28$, P; $L_6 T_x U_5 R_7 N_7$; entomophily, anemochory, endozoochory.
489. *Veronica serpyllifolia* L. – Ulieş; *Nanocyperetalia*, *Rumicion alpini*, *Arrhenatheretalia*, *Cynosurion*; H, Cosm; $2n=14$, 28, D-P; $L_x T_x U_3 R_x N_x$; entomophily, endozoochory, epizoochory.

490. *Veronica orchidea* Crantz – Band, Băla, Cozma, Ercea, Herghelia, Lechincioara, Morești, Porumbeni, Săbed, Sântana de Mureș, Târgu-Mureș, Ulieș, Zau de Câmpie; *Festucion valesiaca*, *Quercetalia pubescentis*; H, Pont-Pan-Balc; $2n=34$, P; $L_8T_6U_3R_7N_3$; entomophily, mirmecochory, endozoochory.
491. *Veronica spicata* L. ssp. *spicata* (*Pseudolysimachion spicatum* (L.) Opiz) – Cozma, Fărăgău, Săbed; *Festucetalia valesiaca*, *Geranion sanguinei*; H (Ch), Euras (subcont); $2n=34$, 68, P; $L_7T_6U_2R_7N_2$; entomophily, mirmecochory, endozoochory;
492. *Veronica teucrium* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Târgu-Mureș, Ulieș; *Geranion sanguinei*, *Festuco-Brometea*, *Quercion pubescenti-sessiliflorae*; H, Euras (cont.); $2n=64$, P; $L_7T_6U_3R_xN_2$; entomophily, endozoochory.

OROBANCHACEAE

493. *Orobanche alba* Stephan – Cozma, Fărăgău, Herghelia, Morești, Ulieș; *Festuco-Brometea*; G, Eur; $2n=38$, D; $L_8T_xU_2N_x$; entomophily, homogamie, proterogyny, anemochory.
494. *Orobanche lutea* Baumg. – Cozma, Fărăgău; *Festuco-Brometea*; G, Euras; $2n=38$, D; $L_8T_6U_3N_x$; entomophily, homogamie, proterogyny, anemochory.

PLANTAGINALES

PLANTAGINACEAE

495. *Plantago lanceolata* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Morești, Porumbeni, Răzoare, Săbed, Sâncraiu de Mureș, Sângiorgiu de Mureș, Șeulia, Târgu-Mureș, Ulieș, Zau de Câmpie; *Puccinietalia*, *Arrhenatheretalia*; H, Euras; $2n=12$, D; $L_7T_xU_xR_xN_x$; anemophily, endozoochory.
496. *Plantago major* L. – Band, Cozma, Fărăgău, Morești, Sâncraiu de Mureș, Șeulia, Târgu-Mureș, Ulieș; *Cynosurion*, *Lolio-Plantaginion*, *Nanocyperion*; H, Euras; $2n=12$, D; $L_8T_xU_5R_xN_x$; anemophily, epizoochory.
497. *Plantago media* L. – Band, Băla, Cozma, Ercea, Herghelia, Lechincioara, Morești, Porumbeni, Săbed, Sâncraiu de Mureș, Sângiorgiu de Mureș, Sâncraiu de Mureș, Șeulia, Târgu-Mureș, Zau de Câmpie, Ulieș; *Festuco-Brometea*, *Molinio-Arrhenatheretea*, *Brometalia erecti*; H, Euras; $2n=12$, 24, D-P; $L_8T_xU_4R_xN_3$; entomophily, autogamy, epizoochory, cleistogamy, heterostyly.

CAMPANULALES

CAMPANULACEAE

498. *Asyneuma canescens* (W. et K.) Griseb. et Schenk – Balda, Bozed, Fărăgău, Grindeni, Săbed, Ulieș, Zau de Câmpie; *Seslerion-Festucion pallentis*, *Quercetalia pubescentis*, *Festucetalia valesiaca*; H, Pont-Pan-Balc; $2n=32$; $L_8U_3T_6R_7N_x$.
499. *Campanula bononiensis* L. – Cozma, Fărăgău, Herghelia, Morești, Ulieș; *Trifolio-Geranietea*, *Quercetalia pubescentis*; H, Euras (subMed); $2n=34$, D; $L_7T_6U_3R_7N_2$; entomophily, proterandry, autochory, anemochory, endozoochory.
500. *Campanula glomerata* L. – Cozma, Fărăgău, Săbed, Ulieș; *Arrhenatheretalia*, *Festuco-Brometea*, *Origanetalia*; H, Euras; $2n=30$, D; $L_7T_xU_4R_xN_x$; entomophily, proterandry, autochory, anemochory, endozoochory.
501. *Campanula patula* L. ssp. *patula* – Cozma, Morești; *Arrhenatheretalia*, *Arrhenatherion*; TH, Eur; $2n=20$, D; $L_8T_xU_5R_xN_4$; entomophily, proterandry, autochory, anemochory, endozoochory;

502. *Campanula persicifolia* L. – Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Origanetalia*, *Epipactido-Fagenion*, *Cirsio-Brachypodion*, *Quercion-pubescenti-sessiliflorae*; H, Euras; $2n=16$, D; $L_7T_xU_4R_xN_3$; entomophily, proterandry, autochory, anemochory, endozoochory.
503. *Campanula rapunculoides* L. – Fărăgău, Herghelia, Săbed, Ulieş; *Origanetalia*, *Quercio-Fagetea*, *Geranion sanguinei*; H, Euras; $2n=68$, P; $L_6T_6U_4R_7N_4$; entomophily, proterandry, autochory, anemochory, endozoochory.
504. *Campanula sibirica* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festucetalia valesiaca*, *Stipo-Festucetalia pallentis*, *Bromo-Festucetalia pallentis*; H, Euras (cont.); $2n=34$, D; $L_8T_xU_xR_xN_3$; entomophily, proterandry, autochory, anemochory, endozoochory.

ASTERALES

ASTERACEAE

505. *Achillea collina* J. Becker – Ulieş; *Festucetalia valesiaca*, *Festucion pseudovinae*; H, Eur (cont.); $2n=36$, P; $L_9T_6U_2R_7N_2$; entomophily, endozoochory.
506. *Achillea millefolium* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Rumicion alpini*, *Trifolion medii*; H, Euras; $2n=36$, P; $L_8T_xU_4R_xN_5$; entomophily, anemochory, endozoochory, anthropochory.
507. *Achillea seidlilii* J. Presl et C. Presl (*Achillea pannonica* Scheele) – Săbed; *Trifolion medii*, *Festucetalia valesiaca*; H, Eur (Cont); $2n=72$, P; $L_7T_6U_3R_7N_2$.
508. *Achillea setacea* W. et K. – Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş, Zau de Câmpie; *Festucetalia valesiaca*, *Festucion pseudovinae*; H, Euras (cont.); $2n=18$, D; $L_9T_6U_2R_7N_1$; entomophily, endozoochory.
509. *Anthemis tinctoria* L. – Band, Fărăgău, Moreşti, Săbed, Ulieş, Zau de Câmpie; *Convolvulo-Agropyron*, *Festucetalia valesiaca*; H, Euras (cont.); $2n=18$, D; U1, $L_8T_xU_2R_xN_4$; entomophily, anemochory, anthropochory.
510. *Arctium lappa* L. – Band, Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Sântana de Mureş, Târgu-Mureş, Ulieş; *Arction*; TH, Euras; $2n=36$, P; $L_8T_xU_5R_7N_9$; entomophily, anemochory, epizoochory, anthropochory.
511. *Arctium nemorosum* Lej. – Săbed; *Atropion*, *Alnion incanae*; TH, Eur; $2n=36$, P; U3, $L_7T_xU_7R_xN_9$; entomophily, anemochory, epizoochory, anthropochory.
512. *Artemisia absinthium* L. – Band, Cozma, Fărăgău, Păingeni, Râciu, Săbed, Sâncraiu de Mureş, Ulieş, Zau de Câmpie; *Onopordetalia*, *Artemisio-Agropyron*, *Artemisio-Tamaricion*, *Onopordion*, *Arction*; Ch-H, Euras; $2n=18$, D; $L_7T_xU_4R_xN_8$; anemophily, anemochory, endozoochory, epizoochory.
513. *Artemisia austriaca* Jacq. – Moreşti, Săbed, Ulieş; *Festucetalia valesiaca*, *Onopordetalia*; Ch, Euras (cont.); $2n=16$, D; $L_8T_xU_3R_xN_5$; anemophily, anemochory, endozoochory, epizoochory, anthropochory.
514. *Artemisia campestris* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Râciu, Răzoare, Săbed, Sâncraiu de Mureş, Sânmărghita, Şeulia, Târgu-Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Thymo-Festucion rupicola*, *Dauco-Melilotion*; Ch, Euras (cont.); $2n=36$, P; $L_9T_6U_3R_7N_2$.
515. *Artemisia pontica* L. – Cozma, Fărăgău, Moreşti, Săbed, Ulieş; *Festuco-Brometea*, *Agropyro-Kochion*, *Festucetalia valesiaca*, *Festucion pseudovinae*; H (Ch), Euras (cont.); $2n=18$, D; $L_8T_7U_3R_7N_4$

516. *Artemisia vulgaris* L. – Band, Cozma, Fărăgău, Morești, Porumbeni, Săbed, Târgu-Mureș, Ulieș; *Artemisietea*, *Senecion fluviatilis*, *Rumicion alpini*, *Arction*; H, Circ; 2n=16, D; $L_7T_xU_6R_xN_8$; anemophily, anemochory, endozoochory, epizoochory, anthropochory.
517. *Aster amellus* L. – Cozma, Târgu-Mureș; *Geranion sanguinei*, *Festucetalia valesiaca*, *Quercetia pubescentis*; H, Eur-Cont; 2n=18, 36, 54; D-P; $L_7T_xU_4R_xN_3$
518. *Aster linosyris* (L.) Bernh. – Fărăgău, Săbed; *Festuco-Brometia*, *Brometalia erecti*, *Festucetalia valesiaca*; H, Euras (cont.); 2n=18, 36, D-P; $L_8T_6U_3R_7N_2$; entomophily, anemochory.
519. *Bellis perennis* L. – Band, Cozma, Fărăgău, Herghelia, Morești, Săbed, Sâncraiu de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Zau de Câmpie; *Molinio-Arrhenatheretia*, *Cynosurion*; H, Eur; 2n=18, D; $L_8T_xU_xR_xN_5$; entomophily, epizoochory, endozoochory.
520. *Bidens cernuus* L. – Fărăgău, *Bidentalia*; Th, Euras; 2n=24, D; $L_8T_xU_{10}R_xN_9$; entomophily, epizoochory, anthropochory.
521. *Bidens tripartita* L. – Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș; *Bidentetalia*, *Senecion fluviatilis*, *Nanocyperion*; Th, Euras; x=12, 2n=48, P; $L_8T_xU_{10}R_xN_8$; entomophily, epizoochory, anthropochory.
522. *Carduus acanthoides* L. – Cozma, Fărăgău, Săbed, Ulieș; *Artemisietea*, *Onopordetalia*; TH, Eur; 2n=22, D; $L_9T_xU_3R_xN_8$; entomophily, anemochory, anthropochory.
523. *Carlina acaulis* L. ssp. *acaulis* – Morești; *Potentillo ternatae-Nardion*, *Arrhenatheretalia*, *Cynosurion*, *Brometalia erecti*; H, C-Eur-Med; 2n=20, D; U2, $L_7T_xU_8R_xN_8$; entomophily, anemochory, zoochory.
524. *Carduus crispus* L. – Cozma, Morești, Ulieș; *Galio-Urticetia*, *Senecion fluviatilis*, *Artemisietea*, *Alnion incanae*; TH, Eur; 2n=16, D; $L_8T_4U_4R_5N_2$; entomophily, anemochory, anthropochory.
525. *Carduus hamulosus* Ehrh. – Cozma, Morești, Săbed; *Festucion valesiaca*, *Jurineo-Euphorbinenion*; TH, Pont-Pan-Balc; 2n=22, D; $L_9T_6U_3R_7N_3$
526. *Carlina vulgaris* L. – Cozma, Fărăgău, Morești, Săbed, Ulieș; *Brometalia erecti*, *Quercetalia pubescentis*; H-TH, Euras; 2n=20, D; $L_7T_xU_4R_xN_3$; entomophily, autogamy, anemochory.
527. *Cartamus lanatus* L. – Ulieș; *Onopordion*, *Sisymbrium*, *Festucion valesiaca*; Th, Pont-Med, 2n=44, P; $L_8T_6U_4R_7N_x$; entomophily.
528. *Centaurea scabiosa* L. ssp. *spinulosa* (Sprengel) Arcang. (*Centaurea spinulosa* Sprengel) – Fărăgău, Herghelia, Morești, Săbed; *Geranion sanguinei*, *Festucetalia valesiaca*; H, Centr-SE-Eur; 2n=20, D; $L_8T_6U_3R_7N_3$; entomophily, anemochory, endozoochory, autochory.
529. *Centaurea stoebe* L. ssp. *australis* (A. Kern) Greuter (*Centaurea biebersteinii* DC. ssp. *biebersteinii*) – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Festucetalia valesiaca*, *Festucion valesiaca*, *Sisymbrium*; TH-H, Pont-Pan-Balc; 2n=36, P; $L_8T_xU_3R_xN_2$; entomophily, anemochory, endozoochory, autochory.
530. *Centaurea cyanus* L. – Band, Cozma, Fărăgău, Glodeni, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș; *Stellarietia mediae*, *Centauretalia cyani*, *Chenopodietalia albi*, *Scleranthion annui*; Th, Med (devenit Cosm); 2n=24, D; $L_7T_xU_xR_xN_x$; entomophily, anemochory, mirmecochory, anthropochory, autochory.
531. *Centaurea jacea* L. – Săbed; *Trifolion medii*, *Molinio-Arrhenatheretia*; H, Eur; 2n=22, 44, D-P; $L_7T_xU_xR_xN_x$; entomophily, anemochory, endozoochory, autochory.
532. *Centaurea nigrescens* Willd. – Morești; *Molinio-Arrhenatheretia*, *Arrhenatherion*; H, Eur-Centr; 2n=44, P; $L_8T_5U_4R_6N_6$; entomophily, anemochory, endozoochory, autochory.
533. *Centaurea jacea* ssp. *angustifolia* (D. C.) Gremlin (*Centaurea pannonica* (Heuffel) Simonkai) – Săbed; *Festucetalia valesiaca*; H, Centr-SE-Eur; 2n=22, 44, D-P; $L_8T_6U_4R_xN_2$; entomophily, anemochory, endozoochory, autochory.

534. *Centaurea phrygia* L. ssp. *phrygia* (*C. austriaca* Willd.) – Moreşti, Ulieş; *Arrhenatherion*, *Cynosurion*; H, Eur (mont.); $2n=22$, D; $L_8T_4U_5R_5N_4$; entomophily, anemochory, endozoochory, autochory.
535. *Centaurea stoebe* L. ssp. *stoebe* (*Centaurea rhenana* Boreau) – Cozma, *Festucetalia valesiaca*, *Festucetalia vaginata*; TH-H, Eur (Centr.&SE); $2n=18$, D; $L_8T_6U_2R_7N_3$; entomophily, anemochory, endozoochory, autochory.
536. *Centaurea scabiosa* L. – Cozma, Lechincioara, Moreşti, Săbed, Ulieş; H, Eur (centr.& SE); *Festuco-Brometea*, *Danthonio-Brachypodion*, *Geranion sanguinea*; $2n=20$, D; $L_8T_6U_3R_7N_3$; entomophily, anemochory, endozoochory, autochory.
537. *Centaurea trinervia* Willd. – Balda, Grindenii, Luduş, Sărmaş, Zau de Câmpie; *Stipion lessingiana*, *Festucetalia valesiaca*; H, Trans-Taur-Cauc, $L_9T_6U_4R_7N_2$.
538. *Cichorium intybus* L. – Band, Băla, Cozma, Ercea, Fărăgău, Herghelia, Moreşti, Răzoare, Săbed, Şeulia, Sâncraiu de Mureş, Târgu-Mureş, Ulieş, Voiniceni, Zau de Câmpie; *Dauco-Melilotion*, *Arrhenatheretalia*, *Artemisio-Tamaricion*, *Puccinelieta*, *Lolio-Plantaginion*; H, Euras; $2n=18$, D; $L_9T_xU_4R_xN_5$; entomophily, autogamy, anemochory, epizoochory, anthropochory.
539. *Cirsium arvense* (L.) Scop. – Cozma, Fărăgău, Săbed, Ulieş; *Stellarietea mediae*, *Scleranthion annui*, *Onopordion*, *Epilobietea angustifolii*; G, Euras; $2n=34$, D; $L_8T_xU_xR_xN_7$; entomophily, autogamy, dimorfism sexual, autochory, anemochory.
540. *Cirsium canum* (L.) All. – Fărăgău, Moreşti, Săbed, Ulieş; *Magnocaricion elata*, *Molinietalia*, *Alnion incanae*; G, Euras (cont.); $2n=34$, D; $L_8T_6U_8R_7N_x$; entomophily, autogamy, dimorfism sexual, anemochory.
541. *Cirsium furiens* Griseb. et Schenk. – Bozed, Cheţani, Luduş, Târgu-Mureş, Zau de Câmpie; *Onopordion*; Th, Pan-Trans-Getic; $L_7T_5U_3R_xN_6$.
542. *Cirsium pannonicum* (L. fil.) Link. – Cozma, Lechincioara, Săbed, Ulieş; *Cirsio-Brachypodion*; H, Pont-Pan; $2n=34$, D; $L_7T_5U_4R_6N_4$; entomophily, autogamy, anemochory.
543. *Cirsium vulgare* (Savi) Ten. (*Cirsium lanceolatum* (L.) Scop.) – Cozma; *Atropion*, *Onopordetalia*; Th, Euras; $2n=68, 102$, P; $L_8T_xU_5R_xN_8$; entomophily, autogamy, anemochory, mirmecochory.
544. *Crepis biennis* L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Arrhenatheretalia*, *Agrostion stoloniferae*, *Sisymbrium*; TH, Eur; $2n=32, 40, 42$, P; $L_6T_5U_5R_6N_5$; entomophily, anemochory.
545. *Echinops sphaerocephalus* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Săbed, Ulieş; *Dauco-Melilotion*, *Onopordion*; H, Euras (cont.); $2n=32$, P; $L_8T_6U_4R_7N_7$; entomophily, epizoochory.
546. *Erigeron acris* L. – Band, Cozma, Fărăgău, Herghelia, Moreşti, Târgu-Mureş, Ulieş; *Koelerio-Corynephoretea*, *Dauco-Melilotion*; Th-H, Circ; $2n=18$, D; $L_9T_6U_4R_7N_x$; autogamy, anemochory, anthropochory.
547. *Erigeron annuus* (L.) Pers. – Cozma, Moreşti, Ulieş; *Stellarietea mediae*, *Dauco-Melilotion*; Th-H, Adv-Am-N; $2n=27, 36$, P; $L_7T_6U_6R_xN_8$; entomophily, anemochory.
548. *Erigeron canadensis* L. – Cozma, Fărăgău, Herghelia, Săbed, Moreşti, Ulieş; *Stellarietea mediae*, *Brachyaction ciliata*, *Atropetalia*, *Sisymbrietalia*; Th-TH, Adv-Am-N; $2n=18$, D; $L_8T_xU_3R_xN_4$; autogamy, anemochory, anthropochory.
549. *Eupatorium cannabinum* L. – Cozma, Fărăgău; *Senecion fluviatilis*, *Atropion*, *Filipendulion*, *Alnion glutinosae*; H, Euras; $2n=20$, D; $L_6T_xU_6R_xN_8$; entomophily, proterandry, anemochory.
550. *Filago germanica* L. – Ulieş; *Thero-Airion*; Th, S-Euras; $2n=28$, P; $L_8T_5U_3R_xN_2$.

551. *Galinsoga parviflora* Cav. – Cozma, Fărăgău, Herghelia, Ulieș; *Panico-Setarion*, *Brachiacton ciliatae*, *Chenopodietalia albi*; Th, Adv-Am-S; 2n=16, D; $L_7T_xU_5R_xN_8$; entomophily, anemochory, epizoochory, anthropochory.
552. *Gnaphalium sylvaticum* L. (*Omalotheca sylvatica* (L.) Schultz-Bip.) – Herghelia; *Atropetalia*, *Potentillo ternatae-Nardion*; H, Circ; 2n=56, P; $L_8T_4U_5R_4N_6$; entomophily, anemochory;
553. *Hieracium racemosum* Waldst. et Kit. – Herghelia, Săbed; *Symphyto-Fagion*, *Genisto-Quercion*, *Castaneo-Quercion*; H, C&S-Eur; 2n=27, P; $L_5T_5U_4R_5N_3$; entomophily, apogamy, anemochory, autochory.
554. *Hypochoeris maculata* L. – Fărăgău, Ulieș; *Cirsio-Brachypodion*, *Danthonio-Brachypodion*, *Quercetalia pubescentis*; H, Euras; 2n=10, D; $L_7T_xU_xR_xN_2$; entomophily, anemochory.
555. *Inula bifrons* L. – Herghelia; *Origanetalia*, *Quercetalia pubescentis*; H, Centr-Med-Eur; 2n=D; $L_6T_6U_4R_7N_5$; entomophily, anemochory.
556. *Inula britannica* L. – Fărăgău, Morești, Săbed, Ulieș; *Potentillo-Polygonetalia*, *Scorzonero-Juncion gerardi*, *Molinion*; Th, Euras; 2n=32, P; $L_8T_6U_7R_7N_5S_2$; entomophily, anemochory.
557. *Inula conyzae* (Griess.) DC. – Cozma, Săbed; *Origanetalia*, *Geranion sanguinei*; H, Eur-Centr; 2n=32, P; $L_6T_6U_3R_7$; entomophily, anemochory.
558. *Inula ensifolia* L. – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Festucetalia valesiaca*, *Cirsio-Brachypodion*; H, Pont-Pan-Balc; 2n=16, D; $L_8T_6U_2R_7N_4$; entomophily, anemochory.
559. *Inula germanica* L. – Cozma, *Aceri-Quercion*, *Geranion sanguinei*; H, Eur (Centr.&SE); 2n=16, D; $L_8T_6U_3R_7N_2$.
560. *Inula helenium* L. – Band, Cozma, *Lamio-Chenopodietalia*, *Alnion incanae*, *Senecion fluviatilis*; H, Eur-SE; 2n=20, D; $L_7T_6U_5R_7N_5$
561. *Inula hirta* L. – Cozma, Fărăgău, Ulieș; *Geranion sanguinei*, *Quercetalia pubescentis*, *Festucetalia valesiaca*; H, Euras (cont.); 2n=16, D; $L_8T_6U_3R_7N_3$; entomophily, anemochory.
562. *Jurinea mollis* (L.) Reichenb. ssp. *transylvanica* (Spreng.) Nyman – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Stipion lessingiana*; H, subEnd; 2n=30; $L_8T_6U_3R_7N_3$; entomophily.
563. *Lapsana communis* L. – Cozma, Herghelia, Morești, Ulieș; *Lamio-Chenopodietalia*, *Galio-Alliarion*, *Quercu-Fagetea*; Th-H, Euras; 2n=14, D; $L_5T_xU_5R_xN_7$; entomophily, endozoochory.
564. *Leontodon crispus* Will. ssp. *crispus* (*Leontodon asper* (Waldst. et Kit.) Poir. non Forssk) – Moişa, Săbed; *Festucetalia valesiaca*; 2n=8, D; $L_7T_xU_3R_xN_3$.
565. *Leontodon autumnalis* L. – Cozma, Morești, Ulieș; *Molinio-Arrhenatheretea*, *Cynosurion*, *Lolio-Plantaginion*; H, Eur; 2n=12, D; $L_7T_xU_5R_xN_5$; autogamy.
566. *Leontodon hispidus* L. – Cozma, Fărăgău, Herghelia, Morești, Ulieș; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Seslerietalia*, *Calthion*, *Mesobromion*; H, Euras; 2n=14, D; $L_8T_xU_4R_xN_3$; autogamy, anemochory.
567. *Leucanthemum vulgare* Lam. – Cozma, Fărăgău, Herghelia, Morești, Săbed, Ulieș; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Calthion*, *Brometalia erecti*; H, Euras; 2n=18, D; $L_7T_xU_4R_xN_3$; entomophily, autogamy, anemochory, anthropochory.
568. *Matricaria chamomilla* L. (*Matricaria recutita* (L.) Rauschert) – Band, Cozma, Fărăgău; Glodeni, Herghelia, Rîciu, Săbed, Șeulia, Singiorgiu de Pădure, Sâncraiu de Mureș, Târgu-Mureș, Ulieș, Voiniceni; *Matricario-Chenopodion albi*, *Puccinellio-Salicornietea*, *Puccinellion limosae*; Th, Euras; 2n=18, D; $L_7T_xU_6R_7N_5S_4$; entomophily, endozoochory, anthropochory.

569. *Mycelis muralis* (L.) Dumort – Cozma, Fărăgău, Herghelia, Săbed, Ulieş; *Impatiens-Stachion sylvaticae*, *Piceion*, *Quercu-Fagetea*, *Epilobietea angustifoli*; H, Eur; $2n=18$, D; $L_4T_xU_5R_xN_6$; entomophily, anemochory.
570. *Onopordum acanthium* L. – Ulieş; *Onopordetalia*, *Onopordion*; TH, Euras; $2n=34$, D; $L_9T_7U_4R_7N_8$.
571. *Petasites hybridus* (L.) P. Gaertner, B. Meyer et Schreb. – Cozma; *Aegopodion*, *Petasition officinalis*, *Alnion incanae*, *Adenostyletalia*; G (H), Euras; $2n=60$, P; $L_6T_5U_8R_6N_8$.
572. *Pilosella cymosa* (L.) F. W. Schultz et Sch. Bip. (*Hieracium cymosum* L. ssp. *cymosum*) – Cozma, Herghelia, *Geranion sanguinei*, *Festucetalia valesiaca*, *Quercetalia pubescentis*; H, Euras (cont); $2n=36, 54, 63$, P; $L_8T_6U_3R_7N_2$; entomophily, apogamy, anemochory, autochory.
573. *Pilosella officinarum* Vaill. (*Hieracium pilosella* L.) – Band, Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Târgu-Mureş, Zau de Câmpie, Ulieş; *Nardo-Callunetea*, *Potentillo ternatae-Nardion*, *Koelerio-Corynephoretea*, *Festuco-Brometea*; H, Euras; $2n=18, 36, 45, 54, 63$, D; $L_7T_xU_4R_xN_2$; entomophily, apogamy, anemochory, autochory.
574. *Pulicaria vulgaris* Gaertner – Moreşti, *Isoëto-Nanojuncetea*, *Potentillion anserinae*, *Scorzonero-Juncion gerardii*, *Potentillo-Polygonetalia*, *Bidention*; Th, Euras; $2n=18$, D; $L_9T_6U_8R_7N_7S_2$.
575. *Rudbeckia laciniata* L. – Moreşti; H, N-Am Adv; $2n=76$, P; entomophily, anemochory.
576. *Scorzonera austriaca* Willd. – Cheţani, Săbed; G, Euras (subMed), $2n=14$, D; $L_7T_7U_3R_8N_2$.
577. *Scorzonera hispanica* L. – Lechincioara, Moreşti, Ulieş; *Geranion sanguinei*, *Cirsio-Brachypodion*, *Festucion valesiaca*; H, Pont-Med; $2n=14$, D; $L_7T_6U_4R_7N_3$; entomophily, anemochory.
578. *Scorzonera purpurea* L. – Fărăgău; *Cirsio-Brachypodion*; H, Eur (Centr)-Rusia, Siberia; $2n=14$, D; $L_7T_5U_3R_7N_x$; entomophily, anemochory.
579. *Senecio erucifolius* L. – Săbed; *Potentillo-Polygonetalia*, *Festuco-Brometea*, *Cirsio-Brachypodion*; H, Euras; $2n=40$, P; $L_7T_6U_3R_7N_4$; entomophily, anemochory.
580. *Senecio integrifolius* (L.) Clairv. – Săbed, Văleni, Zau de Câmpie; *Quercetalia pubescentis*, *Festucetalia valesiaca*; H, Euras, $2n=48$; P; $L_7T_5U_xR_5N_x$.
581. *Senecio jacobaea* L. – Band, Cozma, Fărăgău, Lechincioara, Moreşti, Săbed, Târgu-Mureş, Ulieş, Zau de Câmpie; *Trifolion medii*, *Arrhenatheretalia*, *Festuco-Brometea*, *Quercu-Fagetea*; H, Euras; $2n=40-80$, P; $L_8T_xU_4R_xN_5$; entomophily, anemochory.
582. *Senecio paludosus* L. – Fărăgău; *Carienion rostratae*, *Phragmiti-magnocaricetea*; H, Euras; $2n=40$, P; $L_6T_6U_9R_xN_6$.
583. *Senecio vulgaris* L. – Band, Cozma, Moreşti, Târgu-Mureş, Ulieş; *Chenopodion glauci*, *Stellarietalia mediae*, *Epilobietea angustifoli*; Th, Euras; $2n=40$, P; $L_7T_xU_5R_xN_8$; autogamy, anemochory, epizoochory, anthropochory.
584. *Serratula radiata* (Waldst. et Kit.) Bieb. – Moreşti, Săbed; *Festucion valesiaca*; H, Pont-Pan-Balc; $2n=30$, D; $L_8T_6U_3R_7N_3$; entomophily, anemochory.
585. *Serratula tinctoria* L. – Săbed; *Molinion*; H, Euras; $2n=22$, D; $L_7T_6U_4R_7N_5$; entomophily, anemochory;
586. *Serratula coronata* L. (*Serratula wolffii* Andrae) – Balda, Miheşu de Câmpie, Săbed; *Molinio-Arrhenatheretea*; H, Pont; $L_7T_6U_6R_7N_x$.
587. *Solidago virgaurea* L. – Cozma, Moreşti, Târgu-Mureş, Ulieş, Zau de Câmpie; *Origanetalia*, *Epilobietea angustifoli*; H, Circ; $2n=18$, D; $L_5T_xU_5R_xN_5$; entomophily, autogamy, anemochory.

588. *Sonchus arvensis* L. – Cozma, Fărăgău, Morești, Ulieș; *Stellarietea mediae*, *Chenopodietalia albi*; H, Euras; 2n=36, 54, P; $L_7T_xU_5R_xN_x$; entomophily, anemochory, anthropochory.
589. *Sonchus oleraceus* L. – Cozma; *Chenopodion glauci*, *Stellarietea mediae*; Th, Cosm; 2n=32, P; $L_7T_xU_4R_xN_8$.
590. *Sonchus palustris* L. – Fărăgău; *Senecion fluviatilis*, *Filipendulion*; H, Eur; 2n=18, D; $L_7T_6U_9R_7N_7$; entomophily, anemochory, anthropochory.
591. *Tanacetum corymbosum* (L.) Schultz Bip. – Cozma, Balda, Băla, Ercea, Zau de Câmpie; *Geranion sanguinei*, *Epipactido-Fagenion*, *Cirsio-Brachypodion*, *Quercetalia pubescentis*; H, Euras; 2n=18, D; $L_7T_xU_3R_xN_4$; entomophily, zoochory.
592. *Tanacetum vulgare* L. – Band, Ceuașu de Câmpie, Cozma, Fărăgău, Glodeni, Râciu, Sâncraiu de Mureș, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni; *Artemisietea*, *Dauco-Melilotion*; H, Euras; 2n=18, D; $L_8T_xU_4R_xN_5$; entomophily, endozoochory.
593. *Taraxacum officinale* agg. Weber – Band, Cozma, Fărăgău, Herghelia, Râciu, Săbed, Sâncraiu de Mureș, Sântana de Mureș, Șeulia, Târgu-Mureș, Ulieș, Voiniceni, Voivodeni, Zau de Câmpie; *Arction*, *Molinio-Arrhenatheretea*, *Lolio-Plantaginion*; H, Euras; 2n=24, P; $L_7T_xU_5R_xN_7$; entomophily, apogamy, anemochory.
594. *Tragopogon pratensis* L. ssp. *orientalis* (L.) Čelak. – Cozma, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*; TH-H, Eur (centr.) & E; 2n=12, D; $L_7T_6U_4R_7N_6$; entomophily, anemochory.
595. *Tragopogon dubius* Scop. – Ulieș; *Dauco-Melilotion*, *Festuco-Brometea*, *Sisymbriion*; TH-Th, Eur (centr.)-Med; 2n=12, D; $L_8T_xU_4R_xN_4$; entomophily, anemochory.
596. *Tripleurospermum inodorum* Schultz-Bip (*Matricaria perforata* Mérat, *Matricaria inodora* L. nom. illegit.) – Cozma, Fărăgău, Herghelia, Ulieș; *Stellarietea mediae*, *Sisymbrietalia*, *Onopordion*, *Chenopodion glauci*; Th-TH, Euras; 2n=18–36, D; $L_7T_xU_xR_xN_6$; entomophily, autogamy, epizoochory, anthropochory.
597. *Tussilago farfara* L. – Band, Ceuașul de Câmpie, Cozma, Fărăgău, Herghelia, Morești, Porumbeni, Săbed, Sâncraiu de Mureș, Sângiorgiu de Mureș, Șeulia, Târgu-Mureș, Voiniceni, Ulieș, Zau de Câmpie; *Dauco-Melilotion*, *Arction*, *Convolvulo-Agropyrion*, *Potentillo-Polygonetalia*, *Sisymbriion*, *Galio-Urticetea*; G, Euras; 2n=60, P; $L_8T_xU_6R_xN_x$; entomophily, anemochory.
598. *Xanthium spinosum* L. – Band, Morești, Porumbeni, Săbed, Ulieș, Zau de Câmpie; *Onopordion*, *Malvion neglectae*, *Stellarietea mediae*; Th, Adv-Am-S; 2n=36, P; $L_8T_6U_4R_7N_5$; anemophily, proterogyny, zoochory, anthropochory.
599. *Xanthium strumarium* L. – Cozma, Fărăgău, Herghelia, Morești, Săbed, Târgu-Mureș, Ulieș; *Sisymbriion*, *Onopordion*, *Brachiacton ciliatae*, *Malvion neglectae*; Th, Euras (devenit Cosm); 2n=36, P; $L_8T_6U_5R_xN_6$; anemophily, proterogyny, zoochory, anthropochory.
600. *Xeranthemum annuum* L. – Ulieș; *Onopordion*, *Artemisio-Agropyrion intermedi*, *Festucion valesiacae*; H, Pont-Med; 2n=12, D; $L_8T_6U_2R_7N_3$.

CL. LILIATAE (MONOCOTYLEDONATAE)

ALISMATALES

BUTOMACEAE

601. *Butomus umbellatus* L. – Cozma, Fărăgău, *Phragmition*, *Oenanthion aquaticae*; Hh, Euras; 2n=26, 39, D-P; $L_6T_xU_{10}R_xN_8$; entomophily, autogamy, proterandry, endozoochory.

ALISMATACEAE

- 602. *Alisma plantago-aquatica*** L. – Cozma, Fărăgău, Ulieş; *Phragmiti-Magnocaricetea*, *Bidention*; Hh, Circ; $2n=14$, D; $L_7T_6U_{10}R_xN_8$; entomophily, anemophily, hydrochory, endozoochory, epizoochory.

NAJADALES (POTAMOGETONALES)

JUNCAGINACEAE

- 603. *Triglochin palustre*** L. – Fărăgău; *Scheuchzerio-Caricetea fuscae*, *Caricion davallianae*, *Molinio-Arrhenatheretea*; H, Circ; $2n=24$, P; $L_8T_xU_9R_xN_1S_4$; anemophily, proterogyny, epizoochory.

NAJADACEAE

- 604. *Najas marina*** L. – Fărăgău; *Zannichellion*, *Oryzion sativae*, *Potamion*, *Rupion maritimae*; Hh, SubCosm; $2n=12$, D; $L_6T_7U_{12}R_7N_6S_2$.

POTAMOGETONACEAE

- 605. *Potamogeton natans*** L. – Fărăgău; *Potametalia*, *Nymphaeion*; Hh, Circ; $2n=52$, P; $L_6T_xU_{11}R_7N_4$.

LILIALES

ALLIACEAE

- 606. *Allium denudatum*** F. Delaroche (*Allium albidum* Fischer ex Bieb. ssp. *albidum*, *Allium flavescens* Besser, *Allium ammophilum* Heuffel) – Cheţani, Fărăgău, Lechincioara, Săbed, Ulieş; *Stipion lessingianae*, *Festucetalia valesiaca*; G, Pont-Dac-Balc; $2n=16$, D; $L_9T_6U_2R_7N_3$; entomophily, endozoochory, mirmecochory, anemochory.
- 607. *Allium ericetorum*** Thore (*Allium ochroleucum* Waldst. et Kit.) – Moreşti, Săbed; *Seslerietalia*; G, Alp-Carp; $2n=16, 32$, D-P; $L_8T_4U_6R_7$; entomophily, endozoochory, mirmecochory, anemochory.
- 608. *Allium oleraceum*** L. – Săbed; *Festuco-Brometea*, *Geranion sanguinei*; G, Eur; $2n=32, 40$, P; $L_7T_6U_3R_7N_4$.
- 609. *Allium paniculatum*** L. – Fărăgău; *Festucetalia valesiaca*; G, Pont-Pan-Balc; $2n=24, 32$, P; $L_9T_2R_7N_x$.
- 610. *Allium scorodoprasum*** L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed; *Seslerietalia*; G, Eur (centr.); $2n=16, 24$, D; $L_6T_6U_6R_7N_7$; entomophily, endozoochory, mirmecochory, anemochory, sometimes pseudoviviparie.

AMARYLLIDACEAE

- 611. *Galanthus nivalis*** L. – Band, Fărăgău, Herghelia, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Fagetalia*; G, Eur (centr.)-subMed; $2n=24$, D; $L_5T_xU_xR_xN_7$; entomophily, mirmecochory.
- 612. *Narcissus poeticus*** L. ssp. *radiiflorus* (Salisb.) Baker (*Narcissus stellaris* Haworth) – Fărăgău; *Polygono-Trisetion*; G, Centr-Eur; $2n=14$, D; $L_8T_5U_6R_5N_x$; entomophily, anemochory.

IRIDACEAE

- 613. *Gladiolus imbricatus*** L. – Cozma; *Polygono-Trisetion*; G, Euras (cont); $2n=60$, P; $L_7T_5U_7R_6N_x$.

614. *Iris aphylla* L. (*Iris hungarica* Waldst. et Kit.) – Fărăgău, Lechința, Morești, Săbed; *Geranion sanguinei*, *Festucion valesiaca*, *Jurineo-Euphorbinenion*; H, Cont-Eur; $2n=24, 40, 48$; D-P; $L_8T_6U_3R_7N_1$; entomophily, sometimes proterandry, anemochory.
615. *Iris graminea* L. – Balda, Band, Grindeni, Lechința, Ulieș, Zau de Câmpie; *Brometalia erecti*, *Geranion sanguinei*; G, Eur (centr.)-subMed; $2n=34$, D; $L_8T_6U_4R_7N_4$; entomophily, sometimes proterandry, anemochory.
616. *Iris pseudacorus* L. – Band, Cozma, Fărăgău, Herghelia, Săbed, Târgu-Mureș, Ulieș; *Phragmitetalia*; G, Eur; $2n=24, 30, 32, 34, 40$, D-P; $L_7T_xU_0R_xN_7$; entomophily, sometimes proterandry, anemochory.
617. *Iris pumila* L. – Cozma, Fărăgău, Lechincioara, Moișă, Morești, Săbed, Ulieș; *Festucetalia valesiaca*, *Stipion lessingiana*, *Festucion valesiaca*; G, Pont-Pan-Balc; $2n=32$, P; $L_7T_6U_3R_7N_3$; entomophily, sometimes proterandry, anemochory.
618. *Iris ruthenica* Ker-Gawler – Bozed, Fărăgău, Lechința, Pânet, Săbed, Șăușă; – *Seslerietalia*; G, Euras (cont.); $2n=...$; $L_8T_5U_4R_6N_3$; entomophily, sometimes proterandry, anemochory.
619. *Iris sibirica* L. – Band, Zau de Câmpie; *Molinion*, *Molinio-Arrhenatheretea*; G, Euras; $2n=28$, D; $L_8T_5U_8R_6N_2$
620. *Iris variegata* L. – Băla, Cuci, Iernut, Luduș, Șăușă, Târgu-Mureș; *Geranion sanguinei*, *Quercetalia pubescentis*, *Festucetalia valesiaca*; G, Pont-Centr-Eur-Balc; $2n=24$, P; $L_7T_6U_3R_7N_x$

LILIACEAE

621. *Anthericum ramosum* L. – Cozma, Fărăgău, Morești, Lechincioara, Săbed, Ulieș; *Geranion sanguinei*, *Festuco-Brometea*, *Quercetalia pubescentis*, *Festucetalia valesiaca*; H, Eur (centr.); $2n=30, 32$, D; $L_6T_6U_4R_7N_4$; entomophily, endozoochory.
622. *Asparagus officinalis* L. – Band, Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Sângiorgiu de Mureș, Târgu-Mureș, Ulieș, Zau de Câmpie; *Origanetalia*, *Quercetalia pubescentis*; G, Euras (subMed); $2n=20$, D; $L_8T_6U_3R_xN_4$; entomophily, proterogyny, endozoochory (ornithochory).
623. *Asparagus tenuifolius* Lam. – Săbed, Târgu-Mureș; *Aro-Carpinenion*, *Quercetea pubescentis*, *Fraxino-Cotinetalia*; G, Pont-Med; $2n=20$, D; $L_6T_xU_4R_xN_x$.
624. *Colchicum autumnale* L. – Băla, Cozma, Ercea, Săbed, Târgu-Mureș, Zau de Câmpie; *Bromion erecti*, *Molinietalia*, *Cynosurion*; G, C-Eur; $2n=38$, D; $L_8T_5U_6R_5N_x$ entomophily, proterogyny, anemochory, mirmecochory.
625. *Convallaria majalis* L. – Band, Cozma, Fărăgău, Glodeni, Herghelia, Săbed, Șeulia, Târgu-Mureș, Ulieș; *Quercu-Fagetea*; G, Eur; $2n=38$, D; $L_5T_xU_4R_xN_4$; entomophily, proterandry, endozoochory.
626. *Erythronium dens-canis* L. – Fărăgău, Herghelia, Săbed, Ulieș; *Lathyro-Carpinenion*; G, Eur (centr.)-subMed; $2n=24$, D; $L_5T_5U_5R_6N_3$; entomophily, mirmecochory.
627. *Fritillaria meleagris* L. – Băla; *Potentillion anserinae*; G, Eur; $2n=24$, P; $L_8T_xU_8R_7N_xS_2$
628. *Fritillaria montana* Hoppe ex W. D. J. Koch – Band, Grebenișu de Câmpie, Grindeni, Herghelia, Lăscud, Cipăieni, Sărmaș, Valea Izvoarelor, Zau de Câmpie; *Quercetalia pubescentis*, *Orno-Cotinetalia*; G, Pont-Med, $2n=18$; P; $L_4T_6U_5R_7N_x$
629. *Gagea lutea* (L.) Ker.-Gawler – Herghelia, Săbed; *Alnion incanae*, *Fagetalia*, *Ulmenion*; G, Euras; $2n=72$, P; $L_2T_xU_6R_7N_7$; anemophily, endozoochory, mirmecochory.
630. *Lilium martagon* L. – Cozma, Herghelia, Ulieș; *Fagetalia*, *Athyrio-Piceetalia*; G, Euras; $2n=24$, D; $L_5T_xU_4R_5N_5$; anemophily, anemochory, autochory.

631. *Maianthemum bifolium* (L.) F. W. Schmidt – Herghelia, Ulieş; *Fagetalia*, *Castaneo-Quercion*, *Vaccinio-Piceetea*; G, Euras; $2n=36$, P; $L_3T_5U_5R_3N_3$; entomophily, autogamy, proterogyny, endozoochory.
632. *Muscari comosum* (L.) Mill. – Cozma, Fărăgău, Moreşti, Ulieş; *Festucion valesiacae*, *Jurineo-Euphorbinenion*, *Stellarietea mediae*; G, Eur; $2n=18$, 27, D; $L_7T_6U_3R_7N_x$; entomophily, autogamy, proterogyny, anemochory.
633. *Muscari tenuiflorum* Tausch. – Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festucion valesiacae*, *Geranion sanguinei*; G, Pont-Pan-Balc; $2n=18$, D; $L_7T_6U_3R_7N_x$; entomophily, autogamy, proterogyny, anemochory.
634. *Ornithogalum pyramidale* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Stellarietea mediae*; G, Eur (centr.); $2n=24$, P; $L_6T_6U_4R_7N_x$; entomophily, anemochory.
635. *Ornithogalum umbellatum* L. – Herghelia, Moreşti, Ulieş; *Veronico-Euphorbion*, *Festuco-Brometea*; G, subMed; $2n=18-20$, 27, 28, 35, 36, 42, 44, 45, 54, 72, 90, 108, D-P; $L_7T_6U_4R_7N_5$; entomophily, anemochory.
636. *Paris quadrifolia* L. – Ulieş; *Fagetalia*; G, Euras; $2n=20$, P; $L_3T_xU_6R_xN_6$; entomophily, autogamy, endozoochory.
637. *Polygonatum hirtum* (Bosc ex Poir.) Pursh (*Polygonatum latifolium* (Jacq.) Desf.) – Fărăgău, Herghelia, Săbed; *Quercio-Fagetea*, *Fagetalia*; G, Pont-Pan-Balc; $2n=20$, D; $L_3T_xU_5R_xN_4$; entomophily, autogamy, endozoochory.
638. *Polygonatum multiflorum* (L.) All. – Fărăgău, Herghelia, Săbed; *Fagetalia*, *Symphyto-Fagion*; G, Euras; $2n=18$, D; $L_3T_6U_5R_7N_4$; entomophily, autogamy, endozoochory.
639. *Polygonatum odoratum* (Mill.) Druce – Cozma, Fărăgău, Săbed, Ulieş; *Quercetea pubescentis*, *Geranion sanguinei*; G, Euras; $2n=20$, D; $L_4T_xU_4R_xN_3$; entomophily, autogamy, endozoochory.
640. *Scilla bifolia* L. – Cozma, Herghelia, Săbed, Ulieş; *Quercio-Fagetea*, *Alnion incanae*, *Lathyro hallersteini-Carpinenion*; G, Eur (centr.&S); $2n=18$, D; $L_5T_xU_6R_xN_6$; entomophily, autogamy, proterogyny, anemochory.
641. *Veratrum nigrum* L. – Băla, Lechincioara, Săbed; *Quercio-Fagetea*, *Quercetalia pubescentis*; H, Euras (cont.); $2n=16$, D, $L_3T_6U_4R_7N_x$

ORCHIDALES

ORCHIDACEAE

642. *Epipactis palustris* (L.) Cr. – Fărăgău; – *Caricion davallianae*, *Molinion*; G, Euras; $2n=40$, P; $L_8T_5U_8R_6N_2$; entomophily, anemochory, autochory.
643. *Hammarbya paludosa* (L.) O. Kuntze – Fărăgău; *Rhynchosporion albae*; G, Euro-Siberian-Nord Am; $2n=28$, D; $L_6T_4U_9R_2$.
644. *Gymnadenia conopsea* (L.) R. Br. – Moreşti, Ulieş; *Brometalia erecti*, *Molinieta*; G, Eur; $2n=40$, 80, P; $L_8T_xU_7R_5N_x$; entomophily, anemochory.
645. *Orchis coriophora* L. – Moreşti, *Molinieta*; G, Centr-Eur; $2n=36$, P; $L_8T_6U_5R_6N_2$; entomophily, anemochory.
646. *Orchis morio* L. – Band, Băla, Cozma, Ercea, Fărăgău, Lechincioara, Moreşti, Săbed, Şeulia, Târgu-Mureş, Ulieş, Zau de Câmpie; *Arrhenatheretalia*, *Molinion*, *Festuco-Brometea*; G, Eur; $2n=36$, P; $L_7T_6U_4R_7N_3$; entomophily, anemochory.
647. *Orchis tridentata* Scop. ssp. *tridentata* – Fărăgău; *Brometalia erecti*, *Festucetalia valesiacae*; G, Eur (centr.); $2n=42$, P; $L_9T_6U_4R_7N_2$.

JUNCALES

JUNCACEAE

- 648. *Juncus conglomeratus*** L. – Fărăgău; *Caricion fuscae*, *Molinietalia*, *Deschampsion*; H, Circ; $2n=42$, P; $L_8T_5U_7R_4N_x$; entomophily, proterogyny, anemochory, adeseori epizoochory.
- 649. *Juncus effusus*** L. – Morești; Ulieș; *Molinietalia*, *Calthion*, *Deschampsion*; H, Cosm; $2n=40$, 42, P; $L_8T_xU_7R_xN_3$; entomophily, proterogyny, anemochory, adeseori epizoochory.
- 650. *Juncus inflexus*** L. – Ulieș; *Deschampsion*, *Potentillion anserinae*; H, Euras; $2n=40$, 42, P; $L_8T_xU_7R_xN_4$; entomophily, proterogyny, anemochory, adeseori epizoochory.
- 651. *Luzula campestris*** (L.) DC. – Cozma, Fărăgău, Morești, Ulieș; *Arrhenatheretalia*; H, Circ; $2n=12$, D; $L_7T_5U_4R_5N_2$; anemophily, anemochory, mirmecochory.
- 652. *Luzula luzuloides*** (Lam.) Dandy et Wilmott – Cozma, Herghelia, Ulieș; *Calamagrostietalia villosae*, *Piceetalia*, *Carici-Epilobion*, *Phyteumo-Trisetion*, *Calamagrostio-Fagenion*, *Quercetalia roboris*; H, Eur (centr.); $2n=12$, D; $L_4T_xU_5R_xN_4$; anemophily, anemochory, mirmecochory.

CYPERALES

CYPERACEAE

- 653. *Carex caryophyllea*** Latourr. – Cozma, Fărăgău, Herghelia, Lechincioara, Morești, Săbed, Ulieș; *Hyperico-Scleranthion*, *Festuco-Brometea*; G, Euras (subMed); $2n=62$, 64, 66, 68, P; $L_8T_6U_4R_xN_2$; anemophily.
- 654. *Carex distans*** L. – Morești, *Potentillo-Polygonetalia*, *Scorzonero-Juncion gerardi*, *Molinion*; H, Euras; $2n=74$, P; $L_9T_6U_7R_7N_xS_5$; anemophily, endozoochory.
- 655. *Carex humilis*** Leysser – Morești, Ulieș; *Stipo-Festucetalia pallentis*, *Thymio-Festucion rupicola*, *Quercetea pubescentis*; H, Euras (cont.); $2n=36$, 38, D-P; $L_7T_xU_3R_7N_3$; anemophily.
- 656. *Carex paniculata*** L. – Fărăgău; *Caricenion rostratae*, *Molinietalia*; H, Circ; $2n=60$, 62, 64, P; $L_7T_5U_9R_5N_4$.
- 657. *Carex pallescens*** L. – Morești, *Potentillo ternatae-Nardion*, *Molinio-Arrhenatheretea*, *Calthion*; H, Circ; $2n=64$, P; $L_7T_xU_6R_xN_x$; anemophily, endozoochory.
- 658. *Carex pilosa*** Scop. – Herghelia, Săbed; *Fagetalia*, *Lathyro-Carpinion*, *Galio-Carpinenion*; H, Centr-Eur; $2n=44$, P; N_5 ; anemophily.
- 659. *Carex vulpina*** L. – Fărăgău; *Magnocaricion ellatae*, *Caricion gracilis*, *Phragmition*, *Agropyro-Rumicion*, *Potentillion anserinae*; Hh-H, Euras; $2n=68$, P; $L_9T_xU_9R_xN_5S_2$; anemophily.
- 660. *Cyperus flavescens*** Jacq. – Fărăgău; *Nanocyperion*; Th, Cosm; $2n=...$; $L_9T_6U_7R_xN_6$.
- 661. *Scirpus sylvaticus*** L. Car. – Cozma, Fărăgău, Herghelia, Sâncraiu de Mureș, Ulieș; *Phragmiti-Magnocaricetea*, *Calthion*, *Alnion incanae*; G, Circ; $2n=62$, 64, P; $L_7T_5U_9R_5N_3$; anemophily, anemochory, epizoochory.

TYPHALES

TYPHACEAE

- 662. *Typha angustifolia*** L. – Cozma, Fărăgău, Ulieș; *Phragmiti-Magnocaricetea*, *Phragmition*; G-Hh, Circ; $2n=30$, D; $L_8T_6U_{10}R_xN_7$; anemophily, proterandry, anemochory.
- 663. *Typha latifolia*** L. – Fărăgău, Sâncraiu de Mureș, Cozma, Ulieș; *Phragmiti-Magnocaricetea*, *Phragmition*; G-Hh, Cosm; $2n=30$, D; $L_8T_6U_{10}R_xN_8$; anemophily, proterandry, anemochory.

SPARGANIACEAE

664. *Sparganium erectum* L. ssp. *erectum* (*Sparganium ramosum* Hudson) – Ulieş; *Phragmition*, *Glycerio-Sparganion*; Hh, Euras; $2n=30$, D; $L_7T_6U_{10}R_xN_5$; hidrogamie, autogamy, proterandry, hydrochory, endozoochory.

POALES (GLUMIFLORAE)

POACEAE

665. *Agropyron cristatum* (L.) Gaertn ssp. *pectinatum* (M.Bieb.) Tzvelv. – Chimitelnic, Crăieşti, Luduş, Miheşu de Câmpie, Zau de Câmpie; *Agropyro-Kochion*, *Festucion valesiaca*; H, $2n=14$, 28; $L_8T_6U_3R_xN_4$
666. *Agrostis capillaris* L. – Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Molinio-Arrhenatheretea*, *Sedo-Scleranthetea*, *Nardenea*, *Quercetalia roboris*, *Brometalia erecti*; H (G), Circ; $2n=28$, P; $L_7T_xU_xN_3$; anemophily, endozoochory, anthropochory.
667. *Agrostis stolonifera* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Agrostion stoloniferae*, *Molinio-Arrhenatheretea*, *Agropyro-Rumicion*, *Potentillo-Polygonetalia*, *Scorzonero-Juncion gerardi*; H, Circ; $2n=28$, 35, 42, P; $L_8T_xU_6R_xN_5$; anemophily, endozoochory, anthropochory.
668. *Alopecurus aequalis* Sobol. – Fărăgău; *Bidentetea*, *Chenopodion glauci*, *Nanocyperion*; H, Circ; $2n=14$, D; $L_9T_xU_9R_xN_9$; anemophily, endozoochory, anthropochory.
669. *Alopecurus pratensis* L. – Coadă vulpii; Cozma, Fărăgău, Moreşti, Ulieş; *Convolvuletia sepium*, *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Potentillion anserinae*, *Filipendulo-Petasition*, *Puccinellio-Salicornietea*, *Calthion*; H, Euras; $2n=28$, 42, P; $L_8T_xU_6R_7N_7S_3$; anemophily, endozoochory, anthropochory.
670. *Anthoxanthum odoratum* L. – Cozma, Fărăgău, Moreşti, Săbed, Ulieş; *Brometalia erecti*, *Nardetea*, *Molinio-Arrhenatheretea*; H, Euras; $2n=10$, 20, D-P; $L_8T_xU_xR_5N_x$; anemophily, endozoochory, anthropochory.
671. *Arrhenatherum elatius* (L.) Beauv. – Cozma, Fărăgău, Herghelia, Moreşti, Ulieş; *Arrhenatheretalia*, *Arrhenatherion*, *Dauco-Melilotion*; H, Euras; $2n=28$, P; $L_8T_xU_5R_6N_7$; anemophily, endozoochory.
672. *Botriochloa ischaemum* (L.) Keng. – Cozma, Lechincioara, Moreşti, Săbed, Ulieş; *Festucetalia valesiaca*; H, Euras (subMed); $2n=40$, 50, 60, P; $L_9T_6U_3R_7N_3$; anemophily, zoochory.
673. *Brachypodium pinnatum* (L.) Beauv. – Cozma, Fărăgău, Herghelia, Lechincioara, Ulieş; *Convolvulo-Agropyron*, *Cirsio-Brachypodion*, *Thymio-Festucion rupicola*, *Danthonio-Brachypodium*, *Quercetalia pubescentis*; H, Euras (subMed); $2n=28$, P; $L_8T_xU_4R_7N_4$; anemophily, endozoochory.
674. *Brachypodium sylvaticum* (Huds.) Beauv. – Herghelia, Săbed; *Trifolion medii*, *Querco-Fagetea*, *Abieti-Piceion*; H, Euras; $2n=18$, D; $L_4T_xU_5R_7N_6$; anemophily, endozoochory.
675. *Briza media* L. – Tremurătoare; Cozma, Fărăgău, Herghelia, Moreşti, Săbed, Ulieş; *Molinion*, *Calthion*, *Arrhenatheretalia*, *Brometalia erecti*; H, Euras; $2n=14$, 28, D-P; $L_8T_4U_xR_7N_2$; anemophily, endozoochory.
676. *Bromus erectus* Hudson – Cozma, Fărăgău, Moreşti, Ulieş; *Molinion*, *Brometalia erecti*; H, Eur (centr.)-Med; $2n=42$, 56, P; $L_8T_5U_3R_7N_3$; anemophily, endozoochory.
677. *Bromus inermis* Leyss. – Cozma, Moreşti, *Cirsio-Brachypodion*, *Quercetalia pubescentis*, *Convolvulo-Agropyron* *Sisymbrium*, *Festuco-Brometea*, *Festucetalia valesiaca*, *Arrhenatherion*; H, Euras (cont.); $2n=28$, 42, 56, 76, P; $L_8T_xU_4R_7N_5$; anemophily, endozoochory.
678. *Bromus japonicus* Thunb. – Herghelia, Moreşti, *Sisymbrietalia*, *Stellarietalia mediae*, *Asplenio-Festucion pallentis*, *Caucalidion*, *Convolvulo-Agropyron*, *Epilobietalia angustifolii*, *Quercetalia pubescentis*; Th-TH, Euras (cont.); $2n=28$, P; $L_8T_6U_4R_7N_3$

679. *Bromus sterilis* L. – Ulieș; *Stellarietea mediae*, *Arction*, *Sisymbrium*, *Balloto-Robinion*, *Lamio-Chenopodietalia*; Th, Euras (subMed); $2n=14$, D; $L_7T_6U_4R_xN_5$; anemophily, endozoochory.
680. *Bromus tectorum* L. – Morești, *Stellarietea mediae*, *Balloto-Robinion*, *Basio laniflorae-Bromion tectorum*, *Festucetalia vaginatae*, *Thero-Airion*, *Sisymbrium*; Th, Euras; $2n=14$, D; $L_8T_6U_3R_7N_4$; anemophily, endozoochory.
681. *Calamagrostis arundinacea* (L.) Roth – Cozma; *Epilobion angustifolii*, *Hypno-Polypodion*, *Piceetalia*, *Calamagrostidion arundinaceae*, *Calamagrostio-Fagenion*, *Quercetalia roboris*; H (G), Euras (cont.); $2n=28$, P; $L_6T_5U_5R_5N_5$.
682. *Calamagrostis epigejos* (L.) Roth – Fărăgău, Ulieș; *Epilobion angustifolii*, *Molinion*, *Atropetalia*, *Artemisio-Tamaricion*; G, Euras; $2n=28$, 42, 56, P; $L_7T_xU_xR_xN_7$; anemophily, epizoochory, anemochory.
683. *Kengia serotina* (L.) Packer (*Cleistogene serotina* (L.) Keng) – Săbed; *Festucion valesiacae*, *Stipo-Festucetalia pallentis*, *Orno-Cotinetalia*; G, Eur(centr.)-Med; $2n=40$, P; $L_8T_6U_3R_7N_2$.
684. *Chrysopogon gryllus* (L.) Trin. – Fărăgău; *Danthonio-Brachypodion*, *Danthonio-Chrysopogonetalia*; H, SubMed; $2n=20$, 40, D; $L_7T_6U_3R_7N_3$.
685. *Cynosurus cristatus* L. – Pieptănariță; Cozma, Fărăgău, Morești, Ulieș; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Cynosurion*; H, Eur; $2n=14$, D; $L_8T_5U_5R_5N_4$; anemophily, mirmecochory, endozoochory.
686. *Dactylis glomerata* L. – Cozma, Fărăgău, Herghelia, Morești, Săbed, Ulieș; *Molinio-Arrhenatheretea*, *Trifolion medii*, *Brometalia erecti*, *Symphyto-Fagion*; H, Euras; $2n=28$, P; $L_7T_xU_4R_xN_6$; anemophily, endozoochory.
687. *Danthonia alpina* Vest – Morești, *Danthonio-Stipion stenophyllae*, *Danthonio-Brachypodion*; H, Centr-Eur-Med; $2n=36$, P; $L_8T_5U_5R_5$; anemophily, zoochory.
688. *Deschampsia caespitosa* (L.) Beauv. – Fărăgău, Morești, *Molinietalia*, *Molinio-Arrhenatheretea*, *Deschampsion*, *Convolvuletalia septium*, *Montio-Cardaminetalia*; H, Cosm; $2n=26$, 39, 49, 52, 56, D-P; $L_8T_xU_7R_xN_3$; anemophily, endozoochory.
689. *Echinochloa crus-galli* (L.) Beauv. – Fărăgău, Ulieș; *Bidentetalia*, *Oryziasativa*, *Chenopodion glauci*, *Stellarietea mediae*, *Chenopodietalia albi*, *Atriplicion nitentis*, *Panico-Setarion*; Th, Cosm; $2n=54$, P; $L_6T_xU_5R_xN_8$; anemophily, epizoochory, hydrochory, anthropochory.
690. *Elymus hispidus* (Opiz) Melderis (*Agropyron intermedium* (Host) Beauv.) – Cozma, Herghelia, Lechincioara, Morești, Ulieș; *Artemisio-Agropyron intermedi*, *Festucetalia valesiacae*; G, Euras (cont.); $2n=42$, P; $L_8T_6U_3R_7N_x$; anemophily, epizoochory, hydrochory, anthropochory.
691. *Elymus repens* (L.) Gould (*Agropyron repens* (L.) Beauv.) – Band, Cozma, Morești, Săbed, Șeulia, Târgu-Mureș, Zau de Câmpie; *Artemisietea*, *Agropyro-Rumicion crispi*, *Potentillo-Polyganetalia*, *Molinio-Arrhenatheretea*; G, Circ; $2n=42$, P; $L_8T_xU_5R_xN_8S_2$; anemophily, epizoochory, hydrochory, anthropochory.
692. *Festuca heterophylla* Lam. – Săbed; *Lathyro-Carpinion*, *Galio-Carpinenion*, *Castaneo-Quercion*; H, Centr-Eur-Submed; $2n=28$, P; $L_5T_5U_5R_6N_4$; anemophily, endozoochory.
693. *Festuca pratensis* Huds. – Cozma, Herghelia, Morești, Săbed, Ulieș; *Molinio-Arrhenatheretea*, *Potentillo anserinae*; H, Euras; $2n=14$, D; $L_8T_xU_6R_xN_6$; anemophily, endozoochory.
694. *Festuca rubra* L. – Cozma, Fărăgău, Herghelia, Morești, Ulieș; *Nardetalia*, *Molinio-Arrhenatheretea*, *Cynosurion*; H, Circ; $2n=42$, P; $L_8T_4U_4R_5N_x$; anemophily, endozoochory.
695. *Festuca stricta* Host ssp. *sulcata* (Hack.) Pils (*Festuca rupicola* Heuff.) – Cozma, Fărăgău, Morești, Săbed, Ulieș; *Artemisio-Agropyron intermedi*, *Festuco-Brometea*, *Festucetalia valesiacae*, *Thymio-Festucion rupicolae*; H, Euras (cont.); $2n=42$, P; $L_9T_xU_3R_7N_2$; anemophily, endozoochory.

696. *Festuca valesiaca* Scheicher – Cozma, Fărăgău, Herghelia, Lechincioara, Moreşti, Săbed, Ulieş; *Festucetalia valesiaca*, *Festucion valesiaca*, *Quercetalia pubescentis*; H, Euras (cont); $2n=14$, D; $L_9T_6U_2R_7N_2$; anemophily, endozoochory.
697. *Glyceria maxima* (Hartm.) Holmberg – Cozma, Fărăgău; *Phragmitetalia*; Hh-H, Circ; $2n=60$, P; $L_9T_6U_{10}R_7N_7$; anemophily, endozoochory, hydrochory.
698. *Holcus lanatus* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Molinio-Arrhenatheretea*, *Arrhenatheretalia*; H, Cosm; $2n=14$, D; $L_7T_5U_6R_5N_4$; anemophily, endozoochory.
699. *Koeleria macrantha* (Ledeb.) Schult. – Herghelia, Lechincioara, Moreşti, Ulieş; *Festuco-Brometea*; H, Circ; $2n=14$, 28, 42, 70, D-P; $L_8T_6U_3R_7N_2$; anemophily, endozoochory.
700. *Lolium perenne* L. – Cozma, Fărăgău, Moreşti, Ulieş; *Arrhenatheretalia*, *Cynosurion*, *Lolio-Plantaginion*, *Plantaginetalia*, *Sisymbrium*; H, Cosm; $2n=14$, D; $L_8T_xU_5R_xN_7$; endozoochory, anthropochory.
701. *Melica uniflora* Retz. – Săbed, Ulieş; *Quercio-Fagetalia*, *Quercetalia pubescentis*; H, Eur (centr.)-subMed; $2n=18$, D; $L_3T_6U_5R_7N_x$; anemophily, mirmecochory, endozoochory.
702. *Nardus stricta* L. – Ulieş; *Potentillo ternatae-Nardion*, *Bromion erecti*; H, Euras (circ); $2n=36$, D; $L_8T_xU_xR_2N_x$; anemophily, epizoochory, anthropochory.
703. *Phleum phleoides* (L.) Karsten – Fărăgău, Herghelia; *Festuco-Sedetalia*, *Festuco-Brometea*; H, Euras (Cont); $2n=14$, 28, D-P; $L_8T_6U_2R_7N_x$.
704. *Phleum pretense* L. – Fărăgău, Herghelia, Moreşti, Săbed; *Arrhenatheretalia*, *Molinio-Arrhenatheretea*; H, Euras; $2n=42$, P; U_3 , $L_7T_xU_5R_xN_6$; anemophily, endozoochory.
705. *Phragmites australis* (Cav.) Trin. ex Steud. – Cozma, Fărăgău, Săbed, Sâncraiu de Mureş, Ulieş; *Phragmiti-Magnocaricetea*, *Phragmition*, *Scorzonero-Juncion gerardii*; G-Hh, Cosm; $2n=36$, 48, c. 96, P; $L_7T_xU_{10}R_7N_5$; anemophily, anemochory.
706. *Poa palustris* L. – Fărăgău, Ulieş; *Caricenion gracilis*, *Magnocaricion elatae*, *Alnion*, *Calthion*, *Phragmition*; H, Circ; $2n=28$, P; $L_7T_xU_9R_7N_7$; anemophily, endozoochory.
707. *Poa pratensis* L. ssp. *pratensis* – Herghelia, Moreşti, Ulieş; *Convolvulo-Agropyron*, *Molinio-Arrhenatheretea*, *Arrhenatheretalia*, *Sisymbrium*, *Lamio-Chenopodietalia*, *Convolvuletalia sepium*; H, Cosm; $2n=42$, 50–78, 91, 98, P; $L_8T_xU_5R_xN_x$; anemophily, endozoochory.
708. *Poa trivialis* L. – Ulieş; *Potentillion anserinae*, *Quercion pedunculiflorae*, *Molinietalia*; H, Euras; $2n=14$, 28, D-P; $L_6T_xU_7R_xN_7$; anemophily, endozoochory.
709. *Setaria pumila* (Poir.) Schultes (*Setaria glauca* auct. non (L.) P. Beauv.) – Mohor roşcat; Ulieş; *Polygono-Chenopodietalia*, *Panico-Setarion*, *Eragrostietalia*, *Atriplicion nitentis*; Th, Cosm; $2n=36$, P; $L_7T_6U_4R_7N_6$; anemophily.
710. *Setaria viridis* (L.) Beauv. – Cozma, Fărăgău, Ulieş; *Polygono-Chenopodietalia*, *Stellarietalia mediae*, *Panico-Setarion*; Th, Cosm; $2n=18$, 36, D; $L_7T_6U_4R_7N_7$; anemophily, endozoochory.
711. *Stipa capillata* L. – Săbed, Ulieş; *Festucetalia valesiaca*, *Festucetalia vaginatae*, *Festuco-Brometea*; H, Cont-Euras; H, Euras (cont); $2n=44$, D; $L_8T_6U_2R_7N_2$.
712. *Stipa lessingiana* Trin. et Rupr. – Ceuaşul de Câmpie, Cheţani, Lechinţa, Luduş, Săbed, Voiniceni, Ulieş, Zau de Câmpie; *Stipion lessingiana*; H, Pont; $2n=44$, D; $L_9T_6U_1R_7N_1$.
713. *Stipa pulcherrima* K. Koch – Balda, Cozma, Lechinţa, Luduş, Miheşul de Câmpie, Lechincioara, Moreşti, Săbed, Ulieş, Zau de Câmpie; *Bromion erecti*, *Asplenio-Festucion pallentis*, *Festucion valesiaca*, *Stipion lessingiana*; H, Eur (centr.)-Med; $2n=44$, D; $L_9T_6U_1R_7N_1$.
714. *Stipa tirsa* Steven – Balda, Fărăgău, Herghelia Vişinelu, Voiniceni, Zau de Câmpie; *Danthonio-Stipion stenophyllae*, *Cirsio-Brachypodion*, *Festucetalia valesiaca*; H, Euras (cont.); $2n=44$, D; $L_9T_6U_3R_7N_2$

715. *Trisetum flavescens* (L.) Beauv. – Cozma, Fărăgău, Herghelia, Ulieș; *Arrhenatherion*, *Polygono-Trisetion*, *Phyteumo-Trisetion*, *Molinio-Arrhenatheretea*; H, Euras (subMed); 2n=28, P; $L_7 T_x U_x R_x N_5$; anemophily, endozoochory, anthropochory.

ARALES

ARACEAE

716. *Arum maculatum* L. – Ulieș; *Fagetalia*, *Lathyro-Carpinion*, *Tilio-Acerion*; G, Eur (centr.&V)-Med; 2n=56, P; $L_3 T_6 U_7 R_7 N_8$; entomophily, proterogyny, endozoochory.

LEMNACEAE

717. *Lemna minor* L. – Cozma, Fărăgău, Ulieș; *Lemnetalia*; Hh, Cosm; 2n=40, 42, 50, P; $L_7 T_x U_{11} R_x N_x$.

Conclusions

The floristic inventory of plants in the Transylvanian Plain includes 717 taxa, of which 693 species, 24 subspecies and 2 forms, distributed in 96 families, represents 20.45% of the total known spontaneous cormophytes in the current flora of our country.

The flora analysis by ecological preferences shows the dominance of light species tolerant to part shade and of light species that tolerate shade only exceptional or temporary; of plants that prefer dry soils and moderately humid and moist; of species common in hillock and hilly areas, a xero-mesothermal flora specific to transition regions from plains to hills. According to soil reaction, the most common species are spread on the neutral soils, from slightly acidic to slightly alkaline. And according to nitrogen content of the soil, a significant percentage of plants are particularly spread on poor mineral nitrogen soil or on very poor nitrogen soil.

Hemicryptophytes prevail in the bioforms spectrum, and in terms of floristic elements, we have noticed the predominance of Eurasian elements, with some tendencies towards mainlanders, followed by Europeans and Circumboreals. This area is also characterised by the presence of a significant contingent of Europeo-Mediterranean and Mediterranean species. The karyological analysis of the flora reveals a high number of diploids in this area, which forms the basis of allopolyploid speciation and demonstrates the age of this flora. On these old groups, new ones have developed, richer in polyploids, hence their high frequency.

33 taxa in various stages of endangerment were identified in the flora of the studied area.

CONTRIBUȚII LA STUDIUL FLOREI SPONTANE VASCULARE DIN CÂMPIA TRANSILVANIEI (JUDEȚUL MUREȘ) (Rezumat)

Obiectivul acestui studiu este realizarea inventarului floristic al cormoflorei din Câmpia Transilvaniei (județul Mureș). Câmpia Transilvaniei este partea centrală a Depresiunii Transilvaniei și se întinde pe teritoriul a trei județe: Bistrița-Năsăud, Mureș și Cluj. Pe teritoriul județului Mureș, *Câmpia Transilvaniei*, situată la nord de Râul Mureș, este o regiune formată din dealuri cu altitudine medie de 400 m și este brăzdată de văile largi ale afluenților râului Mureș.

Ca o consecință a localizării regiunii, a diversității formelor de relief (dealuri, lunci), a variatelor expoziții și înclinații a versanților Câmpia Transilvaniei se caracterizează printr-o mare diversitate de taxoni vegetali, inventarul floristic cuprinzând un număr de 716 taxoni vasculari, incluzând 692 specii, 24 subspecii și 2 forme, repartizați în 96 de familii.

Prezentarea fiecărei specii este însoţită de date ecologice, corologice, cenologice, informaţii privind apartenenţa la diferite grupe de bioforme, elemente floristice şi numărul de cromozomi.

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Fig. 6: *Crambe tataria*



Fig. 7: *Delphinium simonkaianum*



Fig. 8: *Cephalaria radiata*



Fig. 9: *Echium rubrum*



Fig. 10: *Fritillaria montana*



Fig. 11: *Fritillaria meleagris*

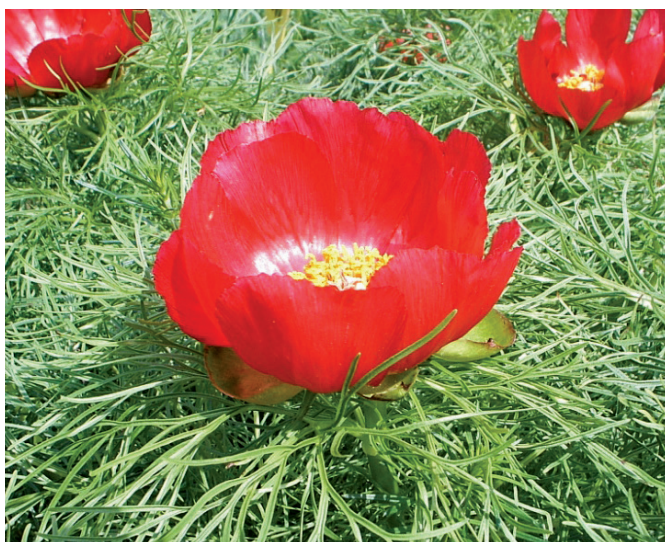


Fig. 12: *Paeonia tenuifolia*



Fig. 13: *Orchis morio*



Fig. 14: *Dictamnus albus*



Fig. 15: *Salvia transsylvanica*



Fig. 16: *Astragalus dasyanthus*



Fig. 17: *Salvia nutans*



Fig. 18: *Epipactis palustris*



Fig. 19: *Astragalus exscapus* var. *transsilvanicus*



Fig. 20: *Adonis vernalis*



Fig. 21: *Aconitum lycoctonum*
ssp. *moldavicum*



Fig. 22: *Prunus tenella*



Fig. 23: *Galanthus nivalis*

DESCRIPTION AND THREATS TO NATURA 2000 HABITAT 7220* PETRIFYING SPRINGS WITH TUFFA FORMATIONS (*CRATONEURION*). A REVIEW

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Abstract: The paper presents the description and threats relating to priority habitat 7220* Petrifying springs with tuffa formation (*Cratoneurion*) listed as priority habitat in Annex I of Habitat Directive 92/43/EEC. The habitat is rare in the world and its importance has required studies in those countries where it occurs. A review of the literature highlighted the plant species composition, and threats in different countries. At the European level, many 7220 habitats are affected by human intervention directly or indirectly by changes in their surroundings.

Keywords: petrifying springs, species composition, assessment, monitoring, threats

Introduction

Assessment and monitoring of biodiversity offer a better understanding of the impact of management actions and identify the ways that management affects biodiversity. Monitoring also offers the possibility of determining whether the management actions fulfil their objectives [10, 20]. The identification of habitats must take into consideration the composition of flora and fauna, their ecological adaptations and their means of dispersal. Most habitats have as a component a plant association. Habitat identification is achieved through the initial identification of the phytocoenoses that characterise, which in turn is based on the diagnostic dominant species and indicator species (ecological and/or phyto-coenological) and site characteristics (geographic location, altitude, relief, soil, etc.) [16].

Calcareous tuffa in nature is a white or variously coloured deposit of calcium carbonate (limestone). It develops when groundwater receives carbon dioxide from deep volcanic sources forming weak carbonic acid. When this acid contacts rocks or sediments rich in calcium, it chemically dissolves the calcium forming a solution that can be transported. Once the solution reaches the surface, the carbon dioxide comes out of solution and the dissolved calcium is transformed into calcium carbonate or calcareous tuffa. For petrifying springs with tuffa formation a combination of the conditions is necessary [23].

1. Geological: deposits rich in calcium carbonate as a calcium source and suitable groundwater regime;
2. Water chemistry: the presence of waters rich in carbon dioxide, forming solutions with calcium;
3. Suitable groundwater characteristics; and

4. Typology: i.e. the location of the emerging springs and the water volume may be low but must be constant.

Tufa may also be called calcite, limestone, etc, and inactive tufa fossil deposits (formed thousands of years ago) are termed travertine.

Petrifying springs with tufa formation are so named because the twigs, mosses, leaves, etc, are in time covered by calcite and seem to be petrified, like statues. ‘Cratoneurion’ is the scientific name for the petrifying springs typical of Europe, reflecting the fact that the moss *Cratoneuron commutatum* (synonym: *Palustriella commutata*) together with some other moss species are normally abundant in these sites. The mosses precipitate carbonate on their stems, “petrifying” them, whilst active growth continues in front of this process. It must be noted that *Cratoneuron commutatum* is not a species characteristic only of petrifying springs with tufa formation, but can be found in areas with wetlands and springs with a more normal base-status [19].

Biologists have been fascinated by the flora and fauna of actively-depositing travertines for many centuries. Because of the specialised physical and chemical features of the travertine, this habitat is home to a great diversity of plants and animals, most of them having some peculiar adaptations to an environment of rapid deposition [23]. Many petrifying springs have suffered from human interference and they are also highly sensitive to changes in their surroundings. If the conditions (shade, microclimate and pH of the water) are not suitable, the mosses and algae on which the habitat depends decline [24].

Material and methods

Due to their restricted distribution at a world level, the habitat 7220* Petrifying springs with tufa formation (*Cratoneurion*) is listed in Annex I of Habitat Directive 92/43/EEC as a priority habitat of community interest [6].

A review of the literature summarised information on the characterisation of the habitat in Romania and elsewhere, its classification, and the plant species and plant associations’ characteristic of the habitat. However, this habitat has received rather limited coverage in the scientific literature.

Different sources [1, 4, 5, 7, 8, 9] described the bryophyte species (*Cratoneuron sp.*, *Bryum sp.*) characteristic of this habitat as being those living in wet places, on substrates rich in bases, but that they are also characteristic of calcareous wet cliffs, springs and cascades that flush the calcareous substrate. *Cratoneuron commutatum* var. *commutatum* (synonym *Palustriella commutata*) and *Cratoneuron filicinum* may form mats of mosses at the surface of calcareous cliffs that become wet, flushed by water, provided the water flow is continuous. As well as tufa-forming habitats, *Bryum pseudotriquetrum* may appear on the abandoned areas at the edges of the lakes and wet cliffs.

Tufa formation at the base of the stems of both mosses and other plants is obvious, and this habitat has characteristic and faithful species represented by bryophytes and other species with ecological requirements specific to wetlands and mineral basic springs [11, 14, 19, 25].

Results and discussions

The habitat in Europe

The habitat 7220* Petrifying springs with tufa formation (*Cratoneurion*) can occur at a variety of scales, typically in stands of a few square metres or less [1, 11, 12, 14, 17, 19, 21, 25, 26]. For instance in Latvia the habitat is very rare, occupying approximately 52 ha of the whole

country and is found in (more or less) small river valleys and associated gullies, or occasionally on cliffs [11]. In Denmark [26] habitat 7220* is mentioned but included within “Raised bogs and mires and fens” as a type of *Calcareous fen*, being described as part of 7230 Alkaline fens. In Norway [1] this habitat type is mostly distributed in alpine areas and mainly corresponds with the vegetation type Rich spring; subtype *Palustriella* spring (N2b).

The EU27 interpretation manual describes the habitat as hard water springs with active formation of travertine or tufa, the habitat occurring in diverse environments such as forests or the open countryside. They are generally of small extent (point or linear formations) and dominated by bryophytes (*Cratoneurion commutati*) [2, 25]. The manual goes on to characterise the composition and related classifications of the habitat as follows:

Plants: *Arabis soyeri*, *Cochlearia pyrenaica* (in sites with heavy metals), *Pinguicula vulgaris*, *Saxifraga aizoides*.

Mosses: *Catocopium nigritum*, *Cratoneuron commutatum*, *C. commutatum* var. *falcatum*, *C. filicinum*, *Eucladium verticillatum*, *Gymnostomum recurvirostrum*.

In the Boreal region also: *Carex appropinquata*, *Epilobium davuricum*, *Juncus triglumis*, *Drepanocladus vernicosus*, *Philonotis calcarea*, *Scorpidium revolvens*, *S. cossoni*, *Cratoneuron decipiens*, *Bryum pseudotriquetum*.

Corresponding categories:

– United Kingdom classification: “M37 *Cratoneuron commutatum*-*Festuca rubra* spring community” and “M38 *Cratoneuron commutatum*-*Carex nigra* spring community”.

– German classification: “220102 kalkreiche Sicker- und Sumpfquelle”, “220302 kalkreiche Sturzquelle”, “220402 kalkreiche, temporäre Sicker- und Stumpfquelle”, “220502 kalkreiche, temporäre Sturzquelle”.

– Nordic classification: “3521 *Philonotis*-typ” and “3522 *Cratoneuron*-typ”.

The manual states that habitat 7220* can form complexes with transition mires, fens, chasmophytic communities of cold and humid environments and heaths and calcareous grassland (*Festuco-Brometalia*).

The habitat in Romania

In Romania, the habitat has a limited occurrence. The Romanian law 49/2011 for Natura 2000 sites [3] includes the habitat 7220* Petrifying springs with tufa formation (*Cratoneurion*). Of the 613,677 ha covered by Natura 2000 sites in Romania, no more than circa 3.16 % represents the distribution of this habitat (detailed in Table 1).

Table 1: The habitat 7220* Petrifying springs with tufa formation (*Cratoneurion*) in Natura 2000 sites in Romania

Nr. Crt.	Natura 2000 sites	Site Code	Site surface (ha)	%	Representativeness	Biogeographic region
1.	Apuseni	ROSCI0002	75,943	0.03	C	Alp Cont
2.	Bicazului–Hășmaș Gorges	ROSCI0027	7,642	0.001	B	Alp
3.	Nerei–Beușnița Gorges	ROSCI0031	37,719	0.001	C	Cont
4.	Șugăului–Munticelu Gorges	ROSCI0033	335	0.1	A	Alp
5.	Ciucaș	ROSCI0038	21,864	0.001	A	Alp
6.	Defileul Jiului	ROSCI0063	10,946	0.001	A	Alp
7.	Domogled – Valea Cernei	ROSCI0069	62,171	0.01	B	Alp Cont
8.	Maramureșului Mountains	ROSCI0124	106,909	1	B	Alp

9.	Rodnei Mountains	ROSCI0125	48,062	0.001	B	Alp
10.	Țarcu Mountains	ROSCI0126	58,657	0.01	B	Alp Cont
11.	Nordul Gorjului de Est	ROSCI0128	49,160	0.0001	A	Alp Cont
12.	Nordul Gorjului de Vest	ROSCI0129	86,958	0.00005	A	Alp Cont
13.	Piatra Mare	ROSCI0195	4,274	0.001	C	Alp
14.	Semenic – Cheile Carașului	ROSCI0226	37,555	0.001	B	Cont
15.	Toplița – Scaunul Rotund Borsec	ROSCI0252	5,466	1	B	Alp
16.	Valea Bobâlna calcareous tufs	ROSCI0254	16	1	A	Cont

Legend: Representativeness: A = excellent; B=good; C=significant; Alp=Alpine; Cont=Continental

Gafta and Mountford [18], describe the habitat 7220* as found around springs with hard (high conductivity) water and active travertine or calcareous tufa formation; sites are generally small (point or linear formations) and dominated by bryophytes (*Cratoneurion commutati*). This European habitat includes two Romanian habitats (R5417 and R5419) [16]. The vegetation associations within the habitat include: *Cratoneuretum filicino-commutati* (Kuhn 1937) Oberd. 1977 (syn.: as. *Cratoneuron commutatum* Pușcaru et al. 1967); *Cochleario pyrenaicae-Cratoneuretum commutati* (Oberd. 1957) Th. Müller 1961 (syn.: *Carici flavae-Cratoneuretum cochlearietosum pyrenaicae* Ștefureac 1972); *Doronico carpatici-Saxifragetum aizoidis* Coldea (1986) 1990. Corresponding to the description format within the EU27 interpretation manual [2], the plant species present are: *Arabis soyeri*, *Cochlearia borzeana* (i.e. *C. pyrenaica*) on areas rich in heavy metals, *Pinguicula vulgaris*, *Saxifraga aizoides*, *Carex appropinquata* and *Juncus triglumis*. Bryophyte species include: *Catocopium nigrum*, *Cratoneuron commutatum*, *C. commutatum* var. *falcatum*, *C. filicinum*, *Eucladium verticillatum*, *Gymnostomum recurvirostrum*, *Drepanocladus vernicosus*, *Philonotis calcarea*, *Drepanocladus revolvens*, *D. cossonii*, *Cratoneuron decipiens* and *Bryum pseudotriquetrum*.

A particularly relevant source of information on habitat 7220* is found in the “Habitat 7220 Fact Sheet for Natura 2000 in Romania” [15], covering Romanian habitats R5417 and R5419 [16]. The author describes the habitat as hydro-hygrophilous, developing on calcareous substrates comprising basophilous plant communities, poor in species and dominated by bryophytes from the genera *Cratoneuron* and *Philonotis*. The water of these springs is rich in bases, often form calcareous tufa due to calcium sedimentation.

Characteristic and dominant species of the Natura 2000 habitat 7220*: *Silene pusilla*, *Saxifraga aizoides*, *Cochlearia pyrenaica* ssp. *borzeana*, *Pinguicula vulgaris*, *Doronium carpaticum*, *Chrysosplenium alpinum*, *Cratoneuron commutatum*, *Cratoneuron filicinum*, *Philonotis calcarea*, *Bryum pseudotriquetrum* and *Calliergonella cuspidate* [18].

For each of R5417 and R5419 Romanian habitats both of which with very limited occurrence in Romania, are describes the correspondence to other classifications, component plant associations and their habitat structure [16].

1. R5417 South-East Carpathian communities with *Cratoneuron commutatum* and *Cratoneuron filicinum*

Correspondence to other classification systems:

NATURA 2000: *7220 Petrifying springs with tufa formations (*Cratoneurion*)

EMERALD: 54.12 Hard water springs

CORINE: 54.12 Hard water springs

PAL.HAB 1999: 54.1221 Hard water bryophyte springs: 54.12241 *Cochlearia pyrenaica* calcareous springs

EUNIS: C2.12 Hard water springs

Plant associations: *Cratoneuretum filicino-commutati* (Kuhn 1937) Oberd. 1977 (Syn.: *Cratoneuron commutatum* Puşcaru et al. 1967); *Cochleario pyrenaicae-Cratoneuretum commutati* (Oberd. 1957) Th. Müller 1961 (Syn.: *Carici flavae-Cratoneuretum cochlearietosum pyrenaicae* Ştefureac 1972).

Habitat R5417 occurs in small patches surrounding streams and has a total extent of <100 ha in Romania with sites at altitudes between 900–2100 m. The typical climate has mean annual temperatures of -1.5°C to 3.5°C and an annual precipitation of 950–1425 mm. The habitat is found in mountainous and subalpine valleys on a basic, limestone substrate with soils that are eutri-cambosols or hydrosols and eu-mesobasic (i.e. pH = 7–7.3).

Habitat structure for R5417: hygrophilous and pronouncedly heliophilous, occurring along springs and rivulets. The herbaceous layer is not well developed and the vegetation height 10–30 cm. Those species that contribute at the geographic differentiation of the phytocoenoses from the Romanian Carpathians include: *Chrysosplenium alpinum*, *Achillea schurii* and *Silene pusilla*. Where the habitat is present, *Cochlearia pyrenaica* (var. *borzeana*) can achieve an average coverage of 40–60%. The moss layer is dominant, sometimes with a cover as high as 80%, in which the characteristic and diagnostic species *Cratoneuron commutatum* normally covers 40%, occurring together with *Cratoneuron filicinum* and *Bryum pseudotriquetrum*.

The habitat is threatened by a reduction in the groundwater supply [15]. The conservation value is very high and it is a priority habitat, with a diverse species composition (Table 2).

Table 2: Diagnostic, characteristic and other important species of Romanian habitat code R5417

Diagnostic Species:	
<i>Cratoneuron commutatum</i>	<i>Cratoneuron filicinum</i>
Characteristic Species	
<i>Cratoneuron commutatum</i>	<i>Cochlearia pyrenaica</i>
<i>Chrysosplenium alpinum</i>	
Other important species	
<i>Silene pusilla</i>	<i>Caltha laeta</i>
<i>Pinguicula vulgaris</i>	<i>Chrysosplenium alternifolium</i>
<i>Saxifraga stellaris</i>	<i>Cardamine amara</i>
<i>Saxifraga aizoides</i>	<i>Bryum pseudotriquetrum</i>
<i>Epilobium nutans</i>	<i>Philonotis calcarea</i>
<i>Epilobium alsinifolium</i>	<i>Deschampsia caespitosa</i>
<i>Crepis paludosa</i>	<i>Stellaria nemorum</i>
<i>Chaerophyllum hirsutum</i>	<i>Viola biflora</i>
Endemic species	
<i>Achillea schurii</i>	

2. R5419 South-East Carpathian communities of springs and rivulets with *Doronicum carpaticum*, *Saxifraga aizoides*, *Chrysosplenium alpinum* and *Achillea schurii*

Correspondence to other classification systems:

NATURA 2000: *7220 Petrifying springs with tufa formations (*Cratoneurion*)

EMERALD: 54.12 Hard water springs

CORINE: 54.12 Hard water springs

PAL.HAB 1999: 54.1226 Carpathian oriental leopardsbane communities

EUNIS: C2.12 Hard water springs

Plant associations: *Doronicum carpatici*–*Saxifragetum aizoidis* Coldea (1986) 1990 (Syn.: *Saxifragetum aizoidis* auct. rom. *Saxifragetum aizoidis* Boşcaiu 1971 non Horvat 1935; *Saxifragetum moschatae*–*aizoidis* Boşcaiu 1971).

Habitat R5419 occurs in small patches surrounding water with a total Romanian extent of about 100 ha. Sites for R5419 occur at altitudes between 980–1900 m, with mean annual temperatures of 1.0–5.5°C and annual precipitation of 1000–1350 mm. The habitat is found in mountainous valleys with a calcareous substrate and soils that are eutricambosols, humid with pH = 6.8–7.1.

Habitat structure for R5419: a hygro-heliophilous habitat situated at the edge of springs that flush calcareous screes and boulders. The herbaceous layer is dominant and 15–30 cm high. Diagnostic and characteristic species cover 35–55%.

The conservation value is very high, being a priority habitat, endemic to the South-East Carpathians. The species composition is diverse (Table 3).

Table 3: Diagnostic, characteristic and other important species of Romanian habitat code R5419

Diagnostic species	
<i>Saxifraga aizoides</i>	<i>Doronicum carpaticum</i>
Characteristic species	
<i>Saxifraga aizoides</i>	<i>Doronicum carpaticum</i>
Other important species	
<i>Saxifraga stellaris</i>	<i>Cardamine amara</i>
<i>Caltha laeta</i>	<i>Epilobium nutans</i>
<i>Chrysosplenium alternifolium</i>	<i>Epilobium alsinifolium</i>
<i>Crepis paludosa</i>	<i>Deschampsia caespitosa</i>
<i>Silene pusilla</i>	<i>Chaerophyllum hirsutum</i>
<i>Pinguicula vulgaris</i>	<i>Stellaria nemorum</i>
<i>Viola biflora</i>	<i>Cratoneuron commutatum</i>
<i>Bryum pseudotriquetrum</i>	<i>Cratoneuron filicinum</i>
<i>Philonotis calcarea</i>	
Endemic species	
<i>Achillea schurii</i>	<i>Chrysosplenium alpinum</i> (sub-endemic)
<i>Doronicum carpaticum</i>	

Threats

All threats are due to human influence directly on the habitat and indirectly on travertine formation [19]. The main threats that affect the habitat directly are physical: drainage of springs/wetlands; changes in land use; overgrazing pressure; excessive trampling (by humans or animals); underground springs drying out; changes in flooding regime; and excessive deforestation of surrounding forests.

Other threats are chemical in character: eutrophication (the habitat is sensitive to nitrogen concentration because of the lack of a peat layer that might attenuate this effect); and decrease in oxygen concentration of underground water because of organic pollution. Only the physical threats may be readily monitored.

In considering the sensitivity of habitat 7220* from Directive Annex I water-dependent habitats [21] refers to existing pressures as well as to developments that may be considered in the future. Assessment of water dependency stresses that the habitat requires water from groundwater. In this respect, potential hydrological impacts comprise: changes in groundwater

levels and flows; water pollution through nutrient enrichment by both N and P of groundwater (diffuse and point-source nutrient pollution); and the relative sensitivity in terms of critical loads for Nitrogen 15–35? Kg N ha⁻¹ yr⁻¹.

Threats that affect the habitat indirectly include declining travertine (tufa) formation in the past 5000 years (late Holocene), in part attributable to humane encroachment and drainage of river catchments [23].

Deforestation accelerates soil erosion affecting tufa formation and the decline of travertine growth and abrasion of existing travertine sites. Accumulated nutrients are released, influencing the plant productivity that controls the travertine fabric. Organic debris (fallen trunks and boughs) is used naturally (by animals like beavers) to build dams as sites for tufa barrages. Both its removal and the loss of those animal populations that help to gather the debris can result in declining travertine formation. Deforestation also leads to direct insolation through lack of shade and increases the variation in stream temperature.

Discharge and travertine deposition are affected by climatic changes with increased or reduced rainfall. Human impact is the major threat on travertine deposition through usage of water resources by humans, leading to drainage and modifications in stream regime, river flow regulation, lowering of water tables by land-use change (deforestation and afforestation). Low water flow reduces turbulence and abates removal of dissolved CO₂. Consequently limestone dissolution rates are reduced, resulting in lowered levels of dissolved calcium carbonate in stream waters, and thus reduced potential for travertine formation.

Deforestation, together with irrigation and urbanisation, bring about increased discharge. Mosses and algae prefer constant environmental conditions and all the threats described here lead to the elimination of travertine and vegetation.

Water pollution through fertilisers, sewage and industrial waste water could have both positive and negative impacts on plant productivity and have different actions on travertine deposition. Travertines are often associated with karst environments, and these areas are frequently used by humans for the disposal of liquid and solid domestic and industrial wastes, leading to groundwater pollution of the karst.

Changes in hydrodynamics follow the abstraction from streams, regarding of the channel, and construction of dams or weirs. These factors determine the increased local turbidity of streams, encouraging removal of dissolved gases and in this way serving as sites for small-scale tufa deposition. The depositional regime of tufa may be modified by alterations in channel and valley geometry, for example by quarrying of geological deposits.

Additional factors may include: acid rain leading to altered pH values (in some areas of Czech Republic it is assumed to reduce travertine deposition); trampling by humans and livestock damaging the tufa fabric; and animal grazing resulting in local eutrophication. The most important additional factor is *tourism*, which brings together all these factors through traffic, bathing and hotels including building activities, sewage, trampling and previous deforestation. For example, in “Cheile Șugăului-Munticelu” Natural Reserve, the habitat is under threat because of a local investor, who already has destroyed a cave and collected the waters of a spring for industrial use. That spring played an important role in the local existence of the natural habitat 7220*. The original protected area („Cheile Șugăului-Munticelu” Natural Reserve) is a pSCI, being a part of the pan-European Network Natura 2000 from Romania [22].

Conclusions

In order to preserve this habitat, whose extent is very limited expanse, it is essential to preserve its surroundings and the whole hydrological system concerned [1]. LIFE projects have demonstrated that restoring the natural conditions for this unique micro-habitat can have a beneficial effect on its long-term survival. A wide range of site-specific hydromorphological actions have been carried out at strategically important sites in Europe [24].

The threats are multiple, most important amongst these being those caused by humans (trampling, lime extraction, regulation or modification of spring outflow) [11]. It seems to be clear that the decline in travertine deposition has been caused either by climatic changes, human impact or both, but there are also observations of the cessation of travertine formation due to less clear causes. Deforestation may well be the main factor in tufa decline, but hard evidence is missing and the reasons are not quite clear [23].

Anthropogenic factors play a significant role in the conservation of fens. They are positively affected by appropriate management of each type of mire vegetation – mowing and extensive grazing. Permanent discharge of groundwater is important for spring habitats such as 7220*. Extensive irregular grazing, leaving ungrazed parts of the mire, or mowing at least once in three years is one of the management requirements for fens [11].

From a management perspective, it is necessary that the hydrological regime of both the tufa site and its neighbouring habitats be preserved, that anthropogenic impacts be reduced or eliminated, and that the surrounding habitats of grasslands and fens be preserved [11]. Appropriate management types should be chosen for each fen (i.e. each petrifying spring habitat), taking into account the former management of the site and the current quality of the habitat. In many fens, transition mires and spring habitats, it is necessary to removed trees and shrubs.

Further investigation in this field is needed, supported by dating and monitoring on deposition sites.

Acknowledgements: The paper is published in the framework of the project RO1567-IBB01/2014. The authors kindly thank to J.O. Mountford for English check and his comments.

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**DESCRIEREA ȘI AMENINȚĂRILE HABITATULUI NATURA 2000 7220* IZVOARE
PIETRIFICATE CU FORMARE DE TRAVERTIN (*CRATONEURION*). RECENZIE
(Rezumat)**

Lucrarea prezintă descrierea și amenințările habitatului 7220* Izvoare petrificate cu formare de travertin (*Cratoneurion*) prezent la habitat prioritar în Anexa I a Directivei Habitate 92/43/EEC. Habitatul este rar la nivel mondial și necesită studii aprofundate în țările în care se găsește. O recenzie a literaturii de specialitate a scos în evidență compoziția speciilor de plante și amenințările habitatului din diferite țări. La nivel european, multe habitate 7220* sunt afectate de intervenția umană în mod direct sau indirect prin schimbări ale mediului înconjurător.

MINIMUM MANAGEMENT MEASURES TO MAINTAIN THE FAVORABLE CONSERVATION STATUS OF THE HABITATS AND SPECIES OF COMMUNITY INTEREST FROM GRĂDIȘTEA MUNCELULUI CIOCLOVINA NATURAL PARK

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Abstract: Grădiștea Muncelului Cioclovina Natural Park is located in the Șureanu Massif, with subdivisions of Sebeș and Orăștie Mountains, being bounded by Hațeg Depression to the west and Orăștie Depression to the north. It includes large areas of forests and other land uses – pastures, meadows, arable, karst areas, watercourses, historical monuments, archaeological sites and human settlements. The objective of this study was to establish a set of minimum management measures to maintain the favorable conservation status of the habitats and species of community interest. The management measures for species and habitats were set analyzing carefully and thoroughly the conditions in each site/area, especially the activities and specific threats of that sites. The proper application of management measures in the area of Grădiștea Muncelului Cioclovina Natural Park will ensure the maintenance of a favorable conservation status for species and habitats.

Keywords: protected area, management measures, habitats, flora, fauna.

Introduction

The park was founded at the judicial level in 1979 and reconfirmed in 1997. In 2000, with the beginning of the law no. 5/2000, Grădiștea Muncelului Cioclovina Natural Park was declared a protected natural area of national interest. According to the OUG 57/2007 regarding the regime for natural protected habitats and wild faunistic and floristic habitats, the park was integrated into the IUCN category 5.

Physico-chemical conditions and climate favored the appearance and development of a specific and varied flora and vegetation. In terms of vegetation, in Grădiștea Muncelului Cioclovina Natural Park predominates wooden phytocoenosis, respectively pure mountain beech forests, followed by pure beech forests of the hills. Another type of wooden vegetation is represented by pure spruce forests, mixed spruce, fir and beech forests, mixed beech forests and forests with *Quercus petraea*.

The most common forest types are:

- mountain beech forest on skeletal soils with mull flora (m);
- normal beech forest with mull flora (m);
- beech forest on rendzinic soils with middle productivity (m);

- hill beech forest on superficial soils with limestone substrate (i).

Most of the forests belong to the fundamental natural type which indicate that in most cases their composition was not altered by the introduction of alien species. Also, there are forests situated in the karst area that occupy approximately 23% of the forest area (functional category 1–2 k, 1–4 c and 1–5 j). The forests that belong to the 1–4 j and 1–5 l category present ecological importance because of the valuable fauna. Even if the forests from the karstic area have a low productivity, these represent a decisive factor in ecological conservation of karst phenomenas and landscape. After deforestation were installed secondary grasslands that occupy a large area. Sub-Mediterranean influence determined the installation of typical shrubs (“sibliacuri”) on calcareous rocks at low altitudes. Coenoses with *Syringa vulgaris*, *Fraxinus ornus* and *Sorbus borbasii* that belong to the *Asplenio-Syringetum vulgaris* association, there are very common in gorges (Crivadia Gorges).

Results and discussions

Grădiștea Muncelului Cioclovina Natural Park overlaps two Natura 2000 sites, with provisional regime of special areas of conservation, according to Order no. 1964/2007 concerning the creation of the protected area of sites of community importance as part of the European ecological network Natura 2000 in Romania:

a) ROSPA0045, Special Protection Area with an area of 38.060 ha, declared by H.G. 1284/2007 regarding the establishment of Special Protection Area as part of the European ecological network Natura 2000 in Romania, with subsequent amendments.

b) ROSCI0087, Site of Community Importance with an area of 39.818 ha declared by H.G.1964/2007 regarding the creation of the protected area of sites of community importance as part of the European ecological network Natura 2000 in Romania, with subsequent amendments.

ROSCI0087 presents 16 natural habitats of community importance, six of them being priority habitats:

- 6110* Rupicolous calcareous or basophile grasslands of the *Alyso-Sedion albi*;
- 6120* Xeric sand calcareous grasslands;
- 6210 Semi-natural dry grasslands and scrubland facies on calcareous substrates (*Festuco – Brometalia*);
- 6230* Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and sub-mountain areas, in Continental Europe);
- 6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*);
- 6430 Hydrophilous tall-herb fringe communities of plains and of the montane to alpine levels;
- 6520 Mountain hay meadows;
- 8240* Limestone pavements;
- 8310 Caves not open to the public;
- 9110 *Luzulo-Fagetum* beech forests;
- 9130 *Asperulo – Fagetum* beech forests;
- 9150 *Medio-European* limestone beech forests of the *Cephalanthero-Fagion*;
- 9180* *Tilio-Acerion* forests of slopes, screes and ravines;
- 91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion*, *Alnion incanae*, *Salicion albae*);

- 91V0 Dacian beech forests (*Symphyto-Fagion*);
- 9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*).

The site is characterized by the presence of important species: 10 species of mammals (*Barbastella barbastellus*, **Canis lupus*, *Lutra lutra*, *Lynx lynx*, *Miniopterus schreibersi*, *Myotis blythi*, *Myotis myotis*, *Rhinolophus ferrumequinum*, *Rhinolophus hipposideros*; **Ursus arctos*), two amphibian species (*Bombina variegata*, *Triturus vulgaris ampelensis*), 9 species of invertebrates (**Austropotamobius torrentium*, **Callimorpha quatripunctaria*, *Eriogaster catax*, *Euphydryas aurinia*, *Gortyna borelii lunata*, *Lycaena dispar*, *Pilemia tigrina*, *Rosalia alpina*, *Osmoderma eremita*), 4 species of fish (*Barbus meridionalis*, *Cottus gobio*, *Eudontomyzon danfordi*, *Sabanejewia aurata*), two angiosperm species (*Campanula serrata*, *Pulsatilla patens*) and one species of mosses (*Dicranum viride*).

The protection and conservation of the habitats of community interest required some general management measures, applicable for the maintaining optimal levels of all these habitats, such as:

- mapping, maintenance and enhancement of existing habitats as well as the population monitoring;
- prohibition of any cuts in priority forest habitats of community interest (91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, 9180* *Tilio-Acerion* forests of slopes, screes and ravines);
- draining prohibition;
- prohibition of forest roads construction in priority forest habitats of community interest (91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*, 9180* *Tilio-Acerion* forests of slopes, screes and ravines);
- promotion of natural and mixed regenerations using local species;
- prohibiting the extraction of construction materials;
- harvest regulation for plants, fruits, mushrooms in priority habitats of community interest;
- grazing regulation and maintaining under the control of domestic livestock;
- control of herbicides, chemical fertilizers and amendments use;
- prohibition of burning vegetation.

In particular, each habitat type requires special management measures, which we will detail for each type of habitat in part:

8310 Caves not open to the public (Cioclovina Dry, Șura Mare, Călianu):

- prohibition of visiting during the maternity of bats, except chiropterologists;
- prohibition of deterioration of existing protection ecosystems;
- prohibition of abandonment in cave: slam, garbage or any kind of organic matter;
- prohibition of fire/primus;
- do not enter into the cave with dirty overalls and boots from another cave;
- moving into the cave to be made in a single row, without exceeding the existing trail.

6230* Species-rich *Nardus* grasslands, on siliceous substrates in mountain areas (and sub-mountain areas, in Continental Europe):

- habitat mapping, highlighting both areas in a favorable conservation status and the degraded surfaces;
- continuation of the traditional grazing in combination, which allows preservation of this type of habitat;
- avoiding the overgrazing which causes degradation and a decrease of specific richness of these grasslands;

- avoiding excessive sheep-folding which determine replacement of this grasslands with other types of plant communities;
- prohibition on the application of amendments based on Ca, which may remove species *Nardus stricta*;
- removal of nitrophilous weed species (*Veratrum album*, *Urtica dioica*, *Rumex alpinus*) by mowing or by repeated sheep-folding;
- prohibition of any form of mechanized machines (motorcycles, ATVs) in grasslands.

6410 *Molinia* meadows on calcareous, peaty or clayey-silt-laden soils (*Molinion caeruleae*):

- maintenance of grassy ecosystems by grazing and mowing;
- avoiding the formation of paths from animal movement;
- avoiding excessive sheep-folding;
- prohibition the entry of transportation or maintenance motorized machines on meadows.

6520 Mountain hay meadows:

- avoiding temporary overgrazing that can lead to degradation causing their transition to *Nardus stricta* grasslands;
- their mowing since late of July, when most species are fructified.

9180* *Tilio-Acerion* forests of slopes, screes and ravines:

- promoting of a conservative management (natural regeneration);
- prohibition/limit the mining in these areas;
- prohibition/limit the construction of forest roads in these habitats;
- prohibition/limit of chemical treatments.

91E0* Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior* (*Alno-Padion, Alnion incanae, Salicion albae*) (Photo 1):

- warning of all those involved in the extraction of timber, observation of the works;
- avoiding the regeneration by shooting from old stumps;
- promoting the natural regeneration of mixed alders in natural habitats, with individuals from seed, with seedlings obtained from a local generative material;



Photo 1: *Telekio-Alnetum incanae* Coldea (1986) 1991

- execution of works to ensure the hydrological regime necessary for habitat conservation;
- prohibiting the extraction of building materials;
- harvesting regulation for plants, berries, mushrooms etc.;
- strict regulation of tourism activities, placing of information and warning billboards at the entrances to the site;
- strict regulation of grazing;
- prohibition of domestic and industrial waste storage.

9110 *Luzulo-Fagetum* beech forests (Photo 2); **9130 *Asperulo-Fagetum* beech forests;**
9150 Medio-European limestone beech forests of the *Cephalanthero-Fagion*; **91V0 Dacian beech forests (*Symphyto-Fagion*)** (Photo 3); **9410 Acidophilous *Picea* forests of the montane to alpine levels (*Vaccinio-Piceetea*):**

- prohibition of planting with species other than those specific to these habitats;
- prohibition of grazing in the forest;
- strict control of tourism activities;
- regulation of the activities of collecting berries, mushrooms, medicinal plants;
- limiting the construction of forest roads;
- avoiding the removal of branches, rotten trunks from the ecosystem, that represent ecological niches for consumers.



Photo 2: *Luzulo-Fagetum* beech forest

Fauna and flora have a particular vulnerability and are constantly under pressure, especially the anthropic impact. Therefore it is necessary to specify general management measures for all species of community interest:

- mapping, maintenance and enhancement of existing species as well as population monitoring;
- avoiding the disturbance of silence for mammalian species;
- prohibiting the practice of motorized sport with ATVs, motorcycles or jeeps on forest roads;
- prohibition of removal from habitat of pups/juveniles/seedlings;
- regulation of hunting for priority species (bear, wolf, lynx);

- educating the younger generation concerning the necessity to preserve species and habitats;
- the fight against poaching;
- control of herbicides, chemical fertilizers and amendments use.



Photo 3: *Phyllitidi-Fagetum* Vida (1959) 1963

In particular, species of community interest are highly varied, so it is important to specify the management measures for each of these, as follows:

Lynx lynx:

- identification and creation of a favorable areas for this species, where human interventions are reduced to the minimum possible;
- effective combating of poaching;
- avoiding the habitat fragmentation.

IUCN considers that this species will be threatened in the near future, imposing monitoring measures of the populations and specific conservation measures. Conservation measures taken so far refer to the population monitoring by personnel involved in wildlife management in Romania and annually estimation of population size. Annually, in Romania are hunted 20–30 individuals of lynx, based on individual licenses and a maximum limits set in advance by the environmental authority.

Canis lupus:

- preventing poaching;
- the dogs who accompanying the shepherds or forestry staff must be vaccinated against rabies;
- limitation of forestry work/other human activities in the main areas favorable for wolf in the period of pups growth.

Lutra lutra:

- prohibition of river pollution;
- prohibition of drainage systems in the upper and middle courses of rivers;
- prohibition of removing vegetation on the riverbanks.

Ursus arctos:

- limitation of human activities in the area of their dens;

- rehabilitation of degraded habitats by human activities;
- prohibition of the waste abandonment.

Entomofauna:

- appropriate management of coniferous forests, spruce and pine in particularly;
- maintenance of fallen trees;
- release of beetles from harvested truffles for consumption or export;
- protection of characteristic habitats;
- reducing of toxic chemical treatments;
- conservation of dry or partially dry pins;
- avoiding the overcollection;
- prohibition of the use of any insecticides or chemical methods to control pests;
- conservation of secular and youngest trees indifferently of their physiological state;
- keeping a protected area as large as possible that includes both isolated trees and forest as a massif;
- limiting grazing and mowing, because the adults of xylophage species are floricultural;
- prohibition of fires in the hollows;
- limiting of fireplaces used by tourists;
- prohibition of removal of wooden elements detached from the trees or as a results of the fall of trees;
- conservation and preservation of dry or attacked trees in the forests;
- maintaining of a high biodiversity in forest ecosystems.

The bats:

- keeping the hollow trees in the exploited areas;
- limiting the access of tourists in caves in which there are maternity colonies in April-May;
- the use of pesticides and insecticides in reasonable amounts not in excess;
- avoid planting the conifers in hilly areas;
- keeping the windbreaks of trees and bushes between cultures in the lowlands;
- prevent the destruction of summer colonies from the human shelters.

Pisces and stone crayfish:

- prohibition the storage of any kind of waste near the watercourses;
- prohibition the discharge of wastewater into watercourses;
- prohibition of hydro facilities and excavation of any kind in riverbeds;
- maintain the wooden vegetation near the riversides;
- limitation the catchment in the upper areas of the rivers;
- limitation the works for recovery of torrents.

Amphibians:

- maintaining the existing aquatic habitats and creation of a new habitats where it is necessary;
- ensure of the dispersion corridors that will allow maintenance of a viable populations.

Birds:

- regulation of forestry exploitation to ensure optimal conditions of life for all birds populations;
- limitation the cutting of shrubs from the forests edge or agricultural areas;
- maintenance of old, dry or degraded trees in the forest.

***Campanula serrata*:**

- regulation of mowing, preferably from the beginning of July to late of August;
- maintaining the groundwater level in the soil;

- prohibiting the collection of this species by tourists, locals, shepherds;
- prohibiting the use of mechanized machines (motorcycles, ATVs) in grasslands;
- awareness of tourists and shepherds (leaflets, brochures) concerning the importance of this species and the habitats in which vegetates;
- practicing of a rational grazing, with a load average herbivores;
- avoid the grazing in the rain for the protection of herbaceous layer.

Pulsatilla patens:

- the removal of bushes;
- the practice of a moderate grazing;
- prohibition of touristic constructions on grasslands with populations of this species;
- harvesting prohibition of this species for sale;
- prohibition of the burning of vegetation;
- camping of tourists in special places;
- awareness tourists shepherds (leaflets, brochures) concerning the importance of this species and the habitats in which vegetates;
- regulation of mowing.

Conclusions

As a corollary of the above we consider that only the application of the proper management measurements in the area of Grădiștea Muncelului Cioclovina Natural Park will ensure the maintenance of a favorable conservation status for species and habitats.

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MĂSURI MINIME DE MANAGEMENT PENTRU MENȚINEREA STĂRII FAVORABILE DE CONSERVARE A HABITATELOR ȘI SPECIILOR DE INTERES COMUNITAR DIN PARCUL NATURAL GRĂDIȘTEA MUNCELULUI CIOCLOVINA (Rezumat)

Parcul Natural Grădiștea Muncelului-Cioclovina este situat în masivul Șureanu, cu subdiviziunile Munții Orăștiei și ai Sebeșului, fiind mărginit de depresiunile Hațegului la vest și Orăștiei la nord. Acesta cuprinde întinse suprafețe de păduri, precum și alte folosințe ale terenurilor – pășuni, fânețe, arabil, zone carstice, cursuri de ape, monumente istorice, situri arheologice și așezări umane. Obiectivul prezentei lucrări a fost elaborarea unui set de măsuri minime de management pentru menținerea stării favorabile de conservare a habitatelor și speciilor de interes comunitar. Măsurile de management pentru specii și habitate au fost stabilite analizând atent și temeinic condițiile din fiecare sit/zonă, în special activitățile și amenințările specifice aceluși sit. Aplicarea adecvată a măsurilor de management în arealul Parcului Natural Grădiștea Muncelului-Cioclovina va asigura menținerea stării de conservare favorabile a speciilor și habitatelor naturale.

CONSERVATION MEASURES FOR SAXICOLE SPECIES IN GRĂDIȘTEA MUNCELULUI CIOCLOVINA NATURE PARK

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Abstract: Grădiștea Muncelului-Cioclovina Nature Park is a protected area, which aims for the protection and conservation of habitats and species important natural flora, fauna, forest, hydrological, geological, palaeontological and soil. Floristic investigations (Saxicola cormoflora) within PNGMC were performed in 2013–2014 and focused on plant species in existing saxicole karst areas and nature reserves. Saxicole species that were studied and monitored included those of community interest, strictly protected, endemic and of national interest, in nature reserves (eg Crivădiei gorges) and karst areas across the park (Cioclovina, Piatra Roșie, areas with caves, potholes, etc.). The study took place in PNGMC, in some areas of the park meant for integrated protection, namely: Șura Mare Cioclovina-Piatra Roșie; Cheile Crivădiei-Comărnicele-Perete; Complexul carstic Răchiștea – Tecuri; Dealul Bolii. Some of the plant species found in saxicole habitats: *Dianthus spiculifolius*, *Melampyrum bihariense*, *Hieracium transsilvanicum*, *Helleborus purpurascens*, *Sedum hispanicum*, *Cytisus albus*, *Cytisus austriacus*, *Euonymus verrucosus*, *Dictamnus albus*, *Silene armeria*, *Silene latifolia ssp alba*, *Sorbus aucuparia*, *Saxifraga cuneifolia*, *Daphne mezereum*, *Asplenium trichomanes*, *scolopendrium Asplenium*, *Asplenium ruta-pickling*, *Cardamine bulbifera*, *Carex montana*, *Clematis alpina*, *Thymus comosus*, *Erysimum comatum*, *ver-nus Crocus*, *Anemone nemorosa*, *Silene Saxifraga*, *cordatum Symphytum*, *Pulmonaria rubra*, *Daphne mezereum*, *Lonicera xylosteum*, *borbasii Sorbus*, *Syringa vulgaris*, *Hepatica nobilis*, *Soldanella* sp. etc. Conservation measures proposed for the studied plant species (endemic strictly protected, rare, community interest and priority) are: Banning the collection of species by tourists, locals, shepherds; Prohibit the abandonment of waste and deposit them in dedicated facilities; Prohibition of unfair collection for the therapeutic use of saxicole species; Preventing access appropriate animal species habitat; Awareness for tourists on using only the marked trails, avoiding the formation of adjacent paths, along which the vegetation is destroyed; Information for shepherds, local communities and tourists (discussion, leaflets, notices) the importance of saxicole species and the habitats they vegetate.

Keywords: protected area, conservation measures, saxicole species

Introduction

Grădiștea Muncelului – Cioclovina Nature Park is a protected area, which aims for the protection and conservation of habitats and species important natural flora, fauna, forest, hydrological, geological, palaeontological and soil.

Șureanu Mountains, which include PNGM-C, are part of the Central Carpathians. The park occupies the central and south-western part of them.

The landscape is characterized by the presence of very fast slopes with gradients of 31–400 degrees, swift slopes with 16–300 degrees and mountain ridges and hills. The biggest part of the

parc is of medium height, smooth, covered by coniferous and deciduous forests from 1650–1700 m up to 1450 m.

Exokarst is represented by sinkholes, with diameters from 2–3 m to 60 m, Trufas 1961, mostly found in the well known karst depressions Ponorici and Fundatura Ponorului. Endokarst consists of caves, potholes and other such structures.

Grădiştea Muncelului Cioclovina Nature Park is a huge castle of natural groundwater and surface water. The richly branched hydrographic network is collected by Grădişte River, called Godeanu upstream and Beriu downstream, and Strei River called Petros in its origin point, both flowing into Mureş River.

PNGMC is located in the nemoral, with considerable floristic value. Of the endemic species found here we mention: *Hepatica transsilvanica*, *Thymus comosus*, *Symphytum cordatum* and *Sorbus borbasii*.

Physico-chemical conditions and the climate favored the emergence and development over time of a specific flora and varied vegetation. As a result, the flora and vegetation is leveled according to environmental conditions, a decisive role taking on it the altitudinal scale of the relief with approx. 1270 m level difference.

Soils in the park are closely related to parent material, climate, and vegetation, being represented by rendzinas, typical or lytic, prevalent in the western and south-western limestone and brown type eumezobasic north and east in the deciduous and mixed forests. Under spruce stands brown soils, acid, more or less podzolic are prevalent. In river floodplains, alluvial soils and clay-alluvial are mostly found. Soil features are: rendzinas in the limestone; brown eumezobasic in the deciduous and mixed; brown acid in spruce forests; clay-alluvial and alluvial in river valleys.

Of rare taxa that grows in the park area we include: *Sesleria rigida*, *Anacamptis pyramidalis*, *Herminium monorchis*, *Plantago holostium*, *Peucedanum rochelium*, *Festuca pseudodalmatica*, *Dianthus petraeus ssp. petraeus*, and such others.

Pulsatilla patens and *Ligularia sibirica* species are strictly protected by Directive 92/43/EEC. According to Government Emergency Ordinance no. 57/2007, as amended by subsequent law, *Cephalaria radiata* is of national interest and *Galanthus nivalis* of community interest both requiring strict protection.

In terms of vegetation, in the Grădiştea Muncelului – Cioclovina Nature Park wood phytocoenosis predominates, i.e. pure mountain beech forests, followed by pure beech forests of the hills. We also see pure spruce stands, mixed spruce, fir and beech, mixed beech forests, evergreens and so on.

Following deforestation secondary grassland was installed, which now occupies a large area.

Materials and methods

Floristic investigations (Saxicola cormoflora) within PNGMC were performed in 2013–2014 and focused on existing saxicole plant species in karst areas and nature reserves. Saxicole species that were studied and monitored included those of community interest, strictly protected, endemic and of national interest, in nature reserves (eg Crivadie gorges) and karst areas across the park (Cioclovina, Piatra Roşie, areas with caves, potholes, etc.). The study took place in PNGMC, in some areas of the park meant for integrated protection, namely: Şura Mare-Cioclovina-Piatra Roşie; Cheile Crivadie-Comărnicele-Perete; Complexul carstic Răchitea – Tecuri; Dealul Bolii.



Photo 1: The cave Cioclovina cu apă



Photo 2: Dealul Bolii

Results and discussions

The limestone karst habitats consist of beech forests, mesophilic and mezothermophilic vegetation on rocky, hilly, mountainous meadows, xerothermophilous and mesophilic in meadows and thickets.

Influence of the sub-Mediterranean resulted in the installation of thickets on calcareous rocks at low altitudes. Hedges of lilac – *Syringa vulgaris*, *Fraxinus ornus* and *Sorbus borbasii* grouped in *Asplenio-Syringetum* associations, are common in gorges, such as Crivადiei Gorges.

Nature reserves and park karst areas have substantial value for landscape and flora, forming an enclave of thermophilic species, with Dacian and Dacian-Balkan elements, including four endemic species: *Thymus comosus*, *Hepatica transsilvanica*, *Symphytum cordatum* and *Sorbus borbasii* and two rare species: *Dianthus petraeus* and *Sesleria rigida*. One can also find samples of wild lilac, *Syringa vulgaris*, *Fraxinus ornus* and *Sorbus borbasii*. Throughout the park numerous rare taxons can be found, including: *Sesleria rigida*, *Anacamptis pyramidalis*, *Herminium monorchis*, *Plantago holosteum*, *Peucedanum rochelimum*, *Festuca pseudodalmatica* and the like.

Dealul Bolii is characterized as a floral, landscape and speological complex, home to thermophilic species such as *Syringa vulgaris*, *Fraxinus ornus* and endemic species *Sorbus borbasii* and *Hepatica transsilvanica*.

Of the plant species found in saxicole habitats we mention: *Dianthus spiculifolius*, *Melampyrum bishariense*, *Hieracium transsilvanicum*, *Helleborus purpurascens*, *Sedum hispanicum*, *Cytisus albus*, *Cytisus austriacus*, *Euonymus verrucosus*, *Dictamnus albus*, *Silene armeria*, *Silene latifolia ssp alba*, *Sorbus aucuparia*, *Saxifraga cuneifolia*, *Daphne mezereum*, *Asplenium trichomanes*, *scolopendrium Asplenium*, *Asplenium ruta-pickling*, *Cardamine bulbifera*, *Carex montana*, *Clematis alpina*, *Thymus comosus*, *Erysimum comatum*, *vernus Crocus*, *Anemone nemorosa*, *Silene Saxifraga*, *cordatum Symphytum*, *Pulmonaria rubra*, *Daphne mezereum*, *Lonicera xylosteum*, *borbasii Sorbus*, *Syringa vulgaris*, *Hepatica nobilis*, *Soldanella ssp*, etc..

Plant species have a particular vulnerability and are constantly under pressure, especially by the human population. Therefore it is necessary to specify general management measures for all species of interest.

For the protection and conservation of species of community interest some general management measures are required in order to maintain them at an optimal level, namely:

- a) mapping, maintenance and enhancement of existing habitat and population monitoring;
- b) Regulation of plant harvest.

c) Regulation of grazing and maintaining control of domestic livestock.

The slope of the high rocky walls ensure self-preservation for saxicole species that grow in these biotopes. The main threat is uncontrollable rock-climbing. Mountaineering and climbing should be prohibited in these areas.

For these saxicole species in particular, because they are present on slightly inclined slopes, the main threat is the grazing and uncontrolled tourism in easily accessible areas.

Tourist access outside walking trails.

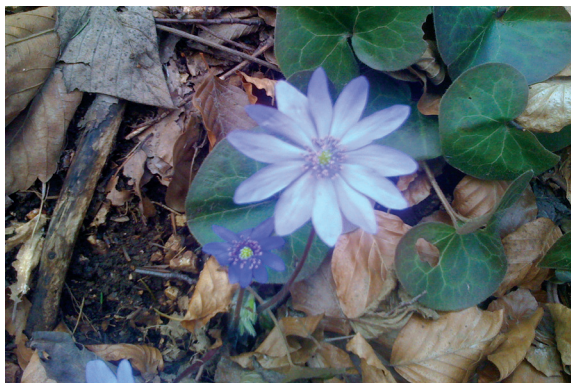


Photo 3: *Hepatica transsilvanica*



Photo 4: *Sorbus borbasii*



Photo 5: *Dianthus spiculifolius* Schur
Crivadieii Gorges



Photo 6: Group of saxicole species
Crivadieii Gorges



Photo 7: *Thymus comosus* Heuff. – Ciolcovina



Photo 8: *Asplenium scolopendrium* L. –
Crivadieii Gorges and Piatra Roșie



Photo 9: *Clematis alpina* (L) Mill. – Crivadieci Gorges Photo 10: *Chamaecyparis austriacus* L. – Piatra Roșie

Conclusions

Conservation measures proposed for the studied plant species (endemic, strictly protected, rare, community interest and priority) are:

- Prohibition of collection of this species by tourists, locals, shepherds.
- Prohibition of abandoning waste in characteristic habitats for these species and depositing them in dedicated facilities.
- Prohibition of abusive collection for therapeutic use of saxicole species.
- Prevent animal access to appropriate habitats (Photo 11).
- Awareness for tourists on using only the marked trails, avoiding the formation of adjacent paths, along which the vegetation is destroyed.
- Information for shepherds, local communities and tourists (discussion, leaflets, notices), concerning the importance of saxicole species and the habitat they vegetate (Photo 12).



Photo 11: Preventing animal access to appropriate habitat



Photo 12: Information for shepherds, local communities and tourists (discussion, leaflets, notices), concerning the importance of saxicole species and the habitat they vegetate



Photo 13, a, b: Aspects of Crivადiei Gorges

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**MĂSURI DE CONSERVARE A SPECIILOR SAXICOLE DIN PARCUL
NATURAL GRĂDIȘTEA MUNCELULUI CIOCLOVINA
(Rezumat)**

Parcul Natural Grădiștea Muncelului – Cioclovina reprezintă o arie naturală protejată cu statut de parc natural, al cărui scop este protecția și conservarea unor habitate și specii naturale importante sub aspect floristic, faunistic, forestier, hidrologic, geologic, speologic, paleontologic și pedologic.

Investigațiile floristice (cormoflora saxicolă) de pe teritoriul PNGM-C au fost efectuate în perioada 2013–2014, și s-au axat pe speciile de plante saxicole existente în zonele de carst și în rezervațiile naturale. Speciile saxicole studiate și monitorizate au fost cele de interes comunitar, strict protejate, endemice și de interes național semnalate în rezervațiile naturale (ex. Cheile Crivădiei) și în zonele carstice de pe raza parcului (Cioclovina, Piatra Roșie, zonele cu peșteri, avene etc.). Studiul s-a desfășurat în arealul PNGMC, în unele zone de protecție integrală a parcului și anume: Șura Mare-Cioclovina-Piatra Roșie; Cheile Crivădiei-Comărnicele-Perete; Complexul carstic Răchitea-Tecuri; Dealul Bolii.

Dintre speciile de plante identificate în habitatele saxicole amintim: *Dianthus spiculifolius*, *Melampyrum bihariense*, *Hieracium transilvanicum*, *Helleborus purpurascens*, *Sedum hispanicum*, *Cytisus albus*, *Cytisus austriacus*, *Euonymus verrucosus*, *Dictamnus albus*, *Silene armeria*, *Silene latifolia* ssp. *alba*, *Sorbus aucuparia*, *Saxifraga cuneifolia*, *Daphne mezereum*, *Asplenium trichomanes*, *Asplenium scolopendrium*, *Asplenium ruta-muraria*, *Cardamine bulbifera*, *Carex montana*, *Clematis alpina*, *Thymus comosus*, *Erysimum comatum*, *Crocus vernus*, *Anemone nemorosa*, *Silene saxifraga*, *Symphytum cordatum*, *Pulmonaria rubra*, *Daphne mezereum*, *Lonicera xylosteum*, *Sorbus borbasii*, *Syringa vulgaris*, *Hepatica nobilis*, *Soldanella* sp. etc.

Măsurile de conservare propuse pentru speciile de plante studiate (endemice, strict protejate, rare, de interes comunitar și prioritar) sunt următoarele: interzicerea colectării acestor specii de către turiști, localnici, ciobani; Interzicerea abandonării deșeurilor în habitatele caracteristice speciilor și depunerea lor în spații special amenajate; interzicerea colectării abuzive pentru utilizări terapeutice a unor specii saxicole; prevenirea accesului animalelor în habitatul corespunzător speciilor; conștientizarea turiștilor asupra folosirii numai a traseelor marcate, evitându-se formarea de cărări adiacente, de-a lungul cărora vegetația s-ar distruge; informarea ciobanilor, comunităților locale și a turiștilor (discuții, pliante, panouri informative) asupra importanței speciilor saxicole și a habitatului în care acestea vegetează.

VULNERABLE FLORA SPECIES IN NATURAL PARK BUCEGI

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Abstract: The biodiversity conservation and the ecology reconstruction are necessary all over the planet, in order to have an environment to ensure a sustainable development on Earth. Specialists through zoology try to find the proper measures to stop or at least mitigate the plant extinction. Over Romania's territory there are 847 protected areas of which 16 are natural parks, like Natural Park Bucegi.

Through the rich flora with a high diversity, Bucegi Massif has a main role in Romanian Carpathians, which attract the attention of many researchers at both nationally and internationally level. Natural Park Bucegi covers 14 Natural Reserves, areas which need a high level of flora protection. Major ecosystems of Bucegi Natural Park are typical for the boreal-continental area, some of the most complex in Europe, very well preserved.

Keywords: zoological, vulnerable, IUCN, Bucegi, conservation measures

Introduction

Natural Park Bucegi is a protected area of national interest which is included in V IUCN category. Framing the present species as vulnerable was made taking into account the International Union for Conservation of Nature – IUCN categories, the main network of professionals worldwide with a leading environment and sustainable development authority.

By the Ministry of Environment law nr.7/1990, Natural Park Bucegi was formalized for the first time as a national park.

Natural Park Bucegi include habitats with a high or very high conservative value, at national and international level: southeast Carpathian meadows of *Nardus stricta* and *Viola declinata*, Dacian forests of *Symphyto-Fagion*, southeast Carpathian forests of *Picea abies* with *Soldanella hungarica*.

The purpose of this paper is the identification of vulnerable species in Natural Park Bucegi flora and their measures for conservation. The preparation of this project followed these objectives: geographical, geological and climatic characterization of Bucegi western sector, description of zoological categories and vulnerable species, endemic value of identified species, cormoflora analysis and establishment of the necessary conservation measures.

Materials and methods

The establishment of the vulnerable plants was made on the basis of the following references: *Red List of extinct endangered, vulnerable and rare higher plants of Romania flora* (Boșcaiu,

N., Coldea, Gh., Horeanu, Cl., 1994) and *Red book of vascular plants in Romania* (Dihoru, G., Negrean, G., 2009).

Each species include information about: synonymies, chorology, cenologic habitat, area, taxon importance, limiting factors, conservation measures, references.

Results and discussions

In the field trips made during July 2011 – July 2013 period, were identified 18 vulnerable species, of which 10 enter in endemic species category. Species that are wide spread in protected areas are: Strunga Mountain complex, Horoabei Valley, Laptici peat, Strungile Mari, Saua Strunga.

Western sector of the Bucegi Natural Park includes 18 vulnerable species: *Aquilegia nigricans ssp. nigricans*, *Trollius europaeus*, *Oxyria digyna*, *Ribes alpinum*, *Saxifraga mutata ssp. demissa*, *Daphne blagayana*, *Angelica archangelica*, *Hesperis nivea*, *Androsace chamaejasme*, *Gentiana lutea*, *Campanula transsilvanica*, *Erigeron nanus*, *Leontopodium alpinum*, *Chamorchis alpina*, *Nigritella nigra*, *Nigritella rubra*, *Rhododendron myrtifolium*, *Sesleria rigida*.

From all the vulnerable species identified in the research field, the following are endemic: *Aquilegia nigricans ssp. nigricans*, *Saxifraga mutata ssp. demissa*, *Daphne blagayana*, *Hesperis nivea*, *Gentiana lutea*, *Campanula transsilvanica*, *Chamorchis alpina*, *Rhododendron myrtifolium*, *Sesleria rigida*, *Erigeron nanus*.

Fam. *Ranunculaceae*

Aquilegia nigricans Baumg. *ssp. nigricans*

Chorology: Pestera Ialomitei Hermitage, Cheile Horoabei

Area: Austria, Bulgaria, Greece, Hungary, Italy, Poland, Romania, Russia

Cenologic habitat: in mountain and subalpine floor

Taxon importance: is given because of is high endemism vulnerability

Limiting factors: endemic to Central and Southwest Europe

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Brândză (1879–1883), 2. D. Grecescu (1909, 1911), 3. Al. Beldie (1967), 4. Monica Neblea (2005), 5. V. Alexiu (2008).

Trollius europaeus L.

Chorology: Pestera Ialomitei, Cheile Brateiului, Cheile Rateiului, Cheile Horoabei

Area: Austria, Bulgaria, Czech Republic, Italy, Norway, Poland, Romania, Russia

Cenologic habitat: spread in almost all mountainous and subalpine regions in several ways, like forest glades, groves, bushes

Limiting factors: widespread in Europe, but only on the south mountains

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Brândză (1879–1883), 2. Al. Beldie (1967), 3. D. Grecescu (1911), 4. Monica Neblea (2005), 5. V. Alexiu (2008), 6. Andreea Natalia Matei (2013).

Fam. *Polygonaceae*

Oxyria digyna (L.) Hill

Chorology: Ialomitei Valley, Ialomitei Cave

Area: Albania, Austria, Bulgaria, Crete, Germany, Ireland, Italy, Norway, Poland, Romania, Russia, Sweden

Cenologic habitat: in the alpine region on the slopes, or rock debris, wet scree at an altitude between 1650–2300 m; decreasing its stature according to altitude, reaching on peaks only 5–6 cm height

Taxon importance: sheep and wild goats are grazing it

Limiting factors: from arctic Europe to Corsica and central Greece

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. T. Kotschy (1853), 2. D. Brândză (1879–1883), 3. D. Grecescu (1909, 1911), 4. Monica Neblea (2005), 5. V. Alexiu (2008).

Fam. Grossulariaceae

***Ribes alpinum* L.**

Synonymy: *Ribes lucidum* Kit.

Chorology: Ialomitei Valley

Area: Austria, Czech Republic, Italy, Norway, Poland, Denmark, Romania, Russia, Sweden

Cenologic habitat: in forests in the mountainous regions, especially in rocky places

Taxon importance: ornamental and fruit consumption

Limiting factors: Northern and Central Europe, and then expanded in the mountains of southern Europe: Northern Spain, Central Italy, Bulgaria and Romania

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Al. Beldie (1972), 2. Monica Neblea (2005), 3. V. Alexiu (2008).

Fam. Saxifragaceae

***Saxifraga mutata* L. ssp. *demissa* (Schott & Kotschy) D.A. Webb**

Synonymy: *Saxifraga demissa* Schott et Kotschy

Chorology: Strungile Mari Mountain, Ialomitei Hermitage, Cheile Tatarului

Area: Romania

Cenologic habitat: located on limestone scree, in shaded places, on the middle and upper mountain floors

Taxon importance: glacial relict, endemism

Limiting factors: endemic in South Carpathian Mountain

Conservation measures: species protected by the location in Natural Park Bucegi and the Berne Convention

References: 1. D. Brândză (1879–1883), 2. D. Grecescu (1898, 1911), 3. Z. Panțu (1904), 4. Al. Beldie (1967), 5. Monica Neblea (2005), 6. V. Alexiu (2008), 7. Andreea Matei (2013).

Fam. Thymelaeaceae

***Daphne blagayana* Freyer**

Synonymy: *Thymelaea dendryobryum* Rothm., *Daphne alpina* Auct. rom. et hung

Chorology: Bucegi Mountains

Area: Albania, Bulgaria, Greece, Romania

Cenologic habitat: rocky slopes, limestone scree, dolomites and serpentine, deciduous or coniferous forest clearings, rocky mountain region

Limiting factors: Alps, Balkans and Romanian endemism

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Al. Beldie (1967), 2. Monica Neblea (2005), 3. V. Alexiu (2008).

Fam. Umbeliferae

***Angelica archangelica* L. (Fig.1)**

Synonymy: *Angelica officinalis* Hoffm.

Chorology: Pesteră Ialomitei, Cheile Zănoagei, Cheile Tătarului, Cheile Horoabei

Area: Czech Republic, Denmark, Finland, Romania, Sweden, Norway

Cenologic habitat: grows along streams, in bogs, in the edges of wet forests in the mountain and subalpine floor

Taxon importance: cultivated as a medicinal plant

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Brândză (1879–1883), 2. D. Grecescu (1898, 1911), 3. Al. Beldie (1967), 4. Monica Neblea (2005), 5. V. Alexiu (2008), Andreea Matei (2013).



Fig. 1: *Angelica archangelica* L.

Fam. Brassicaceae

***Hesperis nivea* Baumg.**

Synonymy: *Hesperis matronalis* L. ssp. *candida* (Kit.) Hegi et Schmid

Chorology: Ialomitei Cave, Ialomitei Valley

Area: Czech Republic, Romania, Russia

Cenologic habitat: rocky places, on river banks in subalpine floor

Limiting factors: endemic species in Carpathian Mountains

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Brândză (1879–1883), 2. D. Grecescu (1911), 3. Monica Neblea (2005), 4. V. Alexiu (2008).

Fam. Ericaceae

***Rhododendron myrtifolium* Schott & Kotschy**

Synonymy: *Rhododendron kotschyi* Simonk; *Rhododendron ferrugineum* L. Ssp *kotschyi* (Simonk.) Hayek

Chorology: Bucegi Mountains, Strungile Mari Mountain

Area: Bulgaria, Romania, Russia, Serbia

Cenologic habitat: common in the alpine and subalpine floor, on gently and steep slopes, throughout the massif or keys

Limiting factors: endemic species in Romania

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Monica Neblea (2005), 2. V. Alexiu (2008), 3. Andreea Matei (2013).

Fam. Primulaceae

***Androsace chamaejasme* Wulfen**

Synonymy: *Androsace villosa* L. Ssp. *chamaejasme* (Wulfen)

Chorology: Pestera Ialomitei Hermitage, Strungile Mari Mountain

Area: Austria, Czech Republic, Greece, Italy, Poland, Romania, Russia

Cenologic habitat: in the alpine zone, in meadows and dry places

Limiting factors: alpin area, dry places

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Brândză (1879–1883), 2. D. Grecescu (1911), 3. Monica Neblea (2005), 4. V. Alexiu (2008).

Fam. Gentianaceae

***Gentiana lutea* L.**

Chorology: Pestera Ialomitei, Cheile Horoabei

Area: Albania, Austria, Bulgaria, Greece, Italy, Romania

Cenologic habitat: on the lower alpine and subalpine floor, sometimes until middle mountain floor, in meadows from sunny slopes and grassy cliffs

Taxon importance: in our country the species is protected, being considered a natural monument. Used in pharmaceutical and food industry.

Limiting factors: endemic plant

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Z. Panțu (1904), 2. D. Grecescu (1911), 3. Al. Beldie (1967), 4. Monica Neblea (2005), 5. V. Alexiu (2008), 6. Magdalena Chirițoiu (2008), 7. Andreea Matei (2013).

Fam. Campanulaceae

***Campanula transsilvanica* Schur ex Andrae**

Synonymy: *Campanula thyrsoidea* Baumg., *Campanula capitata* Schur

Chorology: Strunga Mountain

Areal: Bulgaria, Romania

Cenologic habitat: by rocky and grassy places in subalpine and alpine zone

Limiting factors: endemic species

Conservation measures: species located under Natural Park Bucegi protection area

References: Bibliografie: 1. Al. Beldie (1967), 2. Monica Neblea (2005), 3. V. Alexiu (2008).

Fam. Compositae

***Erigeron nanus* Schur**

Synonymy: *Erigeron hungaricus* (Vierh.) Pawl.

Chorology: Strungile Mari Mountain

Area: Czech Republic, Poland, Romania

Cenologic habitat: in stones slopes and screes in the alpine area

Limiting factors: endemic species

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Monica Neblea (2005), 2. V. Alexiu (2008), Andreea Matei (2013).

***Leontopodium alpinum* Cass.**

Synonymy: *Antennaria leontopodium* (L.) Gaertn.

Chorology: Bucegi Mountains

Area: Albania, Austria, Bulgaria, Czech Republic, Poland, Romania

Cenologic habitat: in the alpine and subalpine regions, rarely in mountain meadows on the rocky slopes, sunny places, usually on limestone substrate, rarely on crystalline schist

Taxon importance: nature monument in Romania from 1933.

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. D. Grecescu (1911), 2. Monica Neblea (2005), 3. V. Alexiu (2008), 4. Andreea Matei (2013).

Fam. Orchidaceae

***Chamorchis alpina* (L.) Rich.**

Synonymy: *Herminium alpinum* (L.) Lindl.

Chorology: Bucegi Mountains

Area: Austria, Czech Republic, Romania, Norway, Sweden, Poland

Cenologic habitat: meadows on rocky soils, in the alpine and subalpine regions, on limestone with high winds

Limiting factors: endemic species

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Al. Beldie (1967), 2. Monica Neblea (2005), 3. V. Alexiu (2008).

***Nigritella nigra* (L.) Rchb. Fil.**

Synonymy: *Nigritella miniata* (Crantz) Janch., *Gymnadenia nigra* (L.) Rchb., *Nigritella angustifolia* Rich.;

Chorology: Pesteria Ialomitei

Area: Albania, Austria, Bulgaria, Greece, Italy, Norway, Romania, Sweden

Cenologic habitat: on meadows in the alpine and subalpine zone, on calcareous substrates

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Al. Beldie (1967), 2. Monica Neblea (2005), 3. V. Alexiu (2008).

***Nigritella rubra* (Wettst.) K. Richt.**

Synonymy: *Nigritella nigra* (L.) Rchb.f. ssp. *rubra* (Wettst.) Beauverd

Chorology: Strungile Mari Mountain

Area: Italy, Romania

Cenologic habitat: meadows in the alpine and subalpine zone, on calcareous substrates

Limiting factors: Alps and Carpathian Mountains

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Monica Neblea (2005), 2. V. Alexiu (2008).

Fam. Gramineae

***Sesleria rigida* Heuff. ex Rchb.**

Synonymy: *Sesleria haynaldiana* Schur, *Sesleria filifolia* Hoppe

Chorology: Cheile Brateiului, Cheile Zanoagei, Cheile Tatarului

Area: Bulgaria, Greece, Romania

Cenologic habitat: in the mountain and alpine zone, on meadows on steep slopes, sunny and shadow rocky lands on calcareous substrate

Limiting factors: endemic species

Conservation measures: species located under Natural Park Bucegi protection area

References: 1. Monica Neblea (2005), 2. V. Alexiu (2008), 1. Andreea Matei (2013).

Vulnerable plants analysis

Through taxonomical analysis (Fig.2), was made the floristic inventory from the studied area, which contains 18 taxa, assigned in 17 genres and 13 families. The floristic abstract reveals that the biggest percentage is held by families: *Ranunculaceae* (2 sp.), *Compositae* (2 sp.), *Orchidaceae* (3 sp), the rest of the families being represented by a single species.

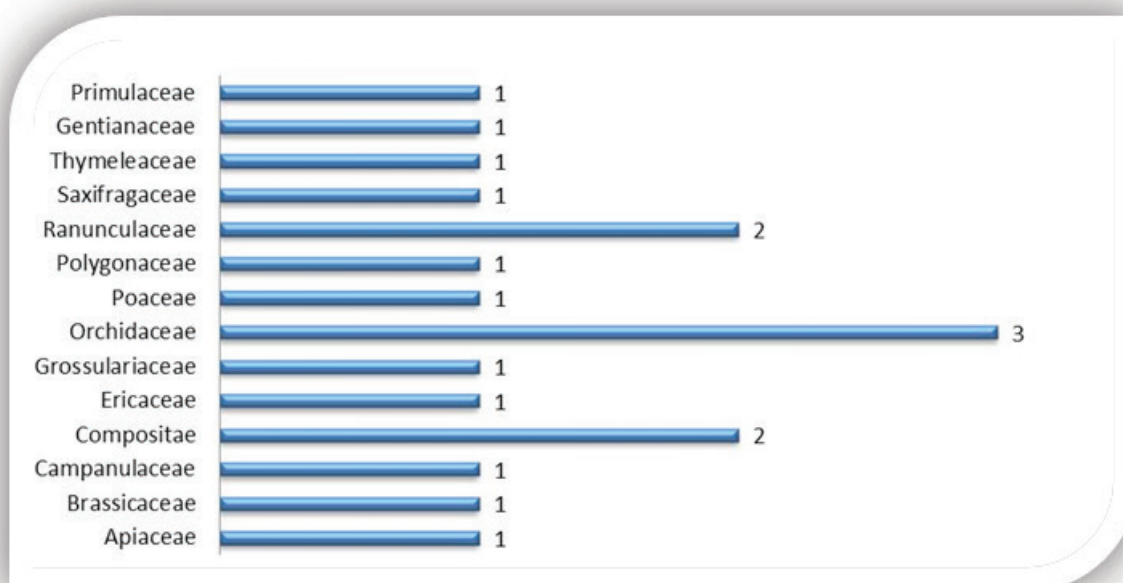


Fig. 2: The number and families of vulnerable species identified in the studied area

The bioforms spectrum analysis (Fig.3) shows the high percentage of hemicryptophyte (44%), which are the main builders of grassy carpet of forest, alpine and subalpine meadows and also of saxicole vegetation. The chamephytes hold a significant percentage (11%), often found especially in subalpine floor and geophytes (17%) represented by ephemeral species.

From total categories of biological forms, annual and biennale therophytes have 8% frequency; this large percentage reveals the existence of a high pressure exercised by anthropical factors over analyzed territory.

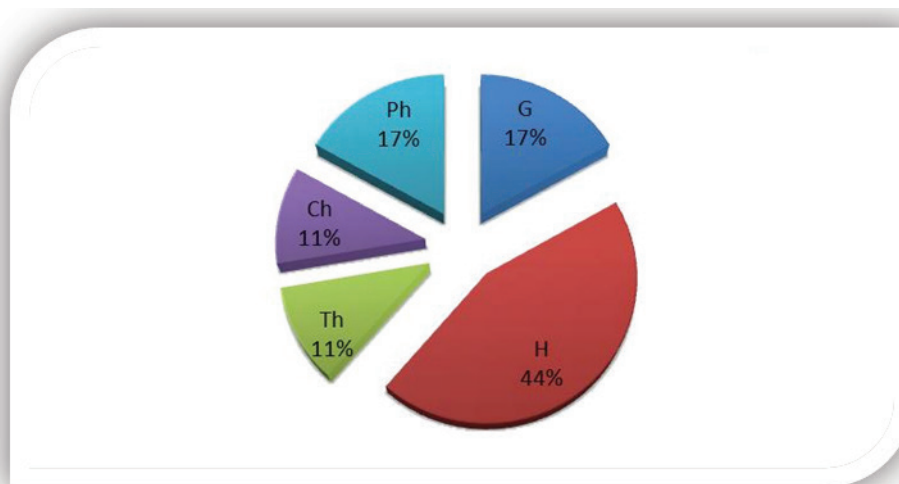


Fig. 3: Bioforms spectrum for zoological category for the vulnerable species in the western sector of the Natural Park Bucegi

Many autochthon elements, with special phytogeographical importance (Fig. 4), offer to the studied territory a particular character, as carpatho-balkan (*Rhododendron myrtifolium*, *Campanula transsilvanica*, *Sesleria rigida*).

The carpathian-endemic elements are represented by the next species: *Hesperis nivea*, *Saxifraga mutata* and *Erigeron nanus*.

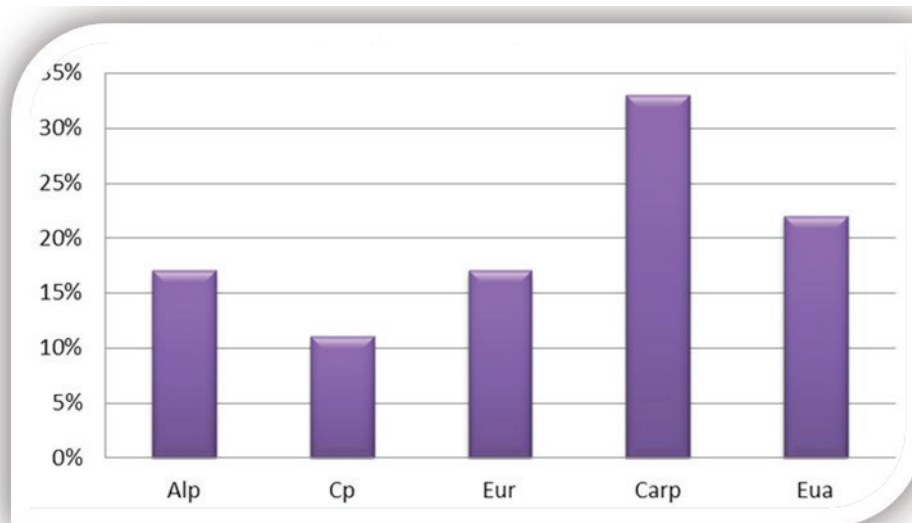


Fig. 4: Phytogeographic analysis of vulnerable species

Highlighting the cormoflora, ecological indices of the investigated area were made taking into account the behavior of the species to ecological factors: humidity, temperature and soil reaction (Fig. 5).

Humidity factor has the largest percentage represented by mesophilic species (U3–3,5 41%), accompanied by xero-mesophile ((U2–2,5 35%), which illustrates the presence of stationary conditions with favorable humidity and habitats of installing xero-mesophile meadow plants. Mezohygrophyte species (U4–4,5 12%) are signs of an excess moisture area that allow the installation of a characteristic vegetation for mountain streams on mountain and subalpine floor.

Regarding the temperature factor, a significant number of species are cryophiles (T1–1,5 50%), typical for cold climate and high altitude, specific to alpine and subalpine vegetation floor.

After soil reaction analysis revealed, that most of the species are weakly acid-neutrophils (R4–50%) and acid-neutrophils (R3–17%), which reflects the existence of favorable conditions for plant grow. In strong leachate territory with acid substrate are growing acidophilus species (R2–11%).

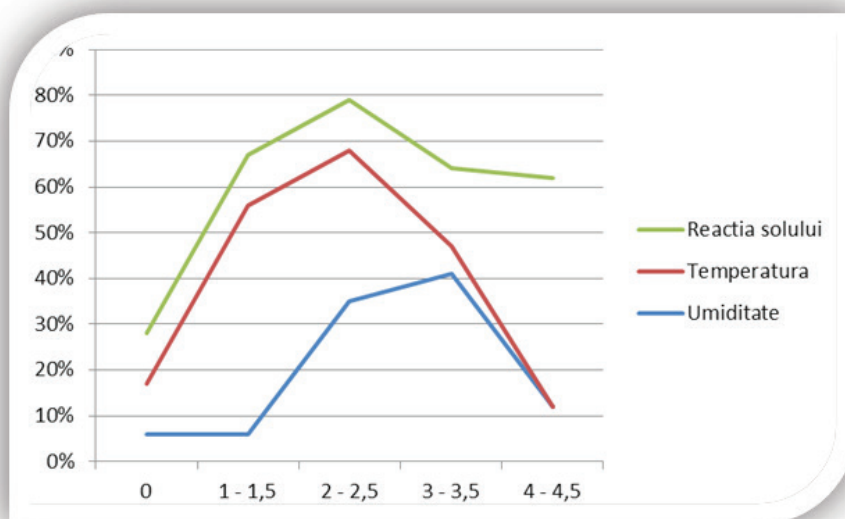


Fig. 5 Ecological factors analysis, humidity, temperature and soil reaction

The percentage structure of vulnerable vegetation floors of Bucegi Natural Park is distributed as follows: 39% alpine floor, 22% alpine and subalpine floor, 17% subalpine and 22% subalpine and mountain floor.

Biodiversity conservation measures of Bucegi Natural Park

According to the National Agency of Environment Protection (ANPM), Bucegi Natural Park includes the following habitat types: freshwater habitats, shrubbery and meadows habitats, rocks habitats and forest habitats. From each habitat type, must been taken a number of measures for nature conservation, provided by Natura 2000 network. Natural and anthropic factors threaten the existence of many plant species. From natural factors, the most common are: unfavorable habitat, natural disasters, sudden climate change, the competition with other species more robust, parasitic fungi as biological degeneration, slow seed germination, etc.. Anthropic factors are the most important, such as human settlements, industries, pollution, tourism, drainage, flooding, deforestation, fires, road construction, landfills, etc..

1. Protection measures for forest habitats. Some of the measures taken for forest protection and conservation of nature are: avoiding transport of timber by dragging, activity break in rainy periods, wood storage must occupy very small areas, preferably at the edges of the road, forestry rules promote natural regeneration in forest habitats, in priority forest habitats, building roads is restricted or prohibited, grazing area is limited, etc.

2. Freshwater habitats require a series of protective measures: avoid building forest roads on riverbed, avoid any kind of vehicle movement on the river shore and riverbed, temporary deposits of harvested wood cannot be established on riverbed. Also is prohibited to abandon branches or other materials and drainage are prohibited or restricted; herbaceous vegetation on mountains rivers should be conserved by stopping grazing around springs and the tourism control activities.

3. For scrubs and meadows are a series of measures for conservation, the following activities are total prohibited: juniper cuttings, cutting green mass, those activities that may affect the natural dynamics of water should be limited.

4. Measures for rocky habitats conservation: exploitation of screes for building materials must not be done; is prohibited opening quarries in rocky slopes that have a protected habitat; there will not be done forest roads on habitat.

Conclusions

European countries show a real concern for the irrational use of biological diversity components. Biodiversity major consequences are found in many qualitative and quantitative changes, also in ecosystems structure and functioning. Biodiversity conservation has been an important objective of EU policy in the last 25 years.

According to the IUCN zoological categories, Natural Park Bucegi has 14,5% of threatened species and subspecies of Romania's flora. In the studied region, vulnerable species occupy 28.8% from the total flora.

Western sector of the Bucegi Natural Park includes 18 vulnerable species: *Aquilegia nigricans* ssp. *nigricans*, *Trollius europaeus*, *Oxyria digyna*, *Ribes alpinum*, *Saxifraga mutata* ssp. *demissa*, *Daphne blagayana*, *Angelica archangelica*, *Hesperis nivea*, *Androsace chamaejasme*, *Gentiana lutea*, *Campanula transsilvanica*, *Erigeron nanus*, *Leontopodium alpinum*, *Chamorchis alpina*, *Nigritella nigra*, *Nigritella rubra*, *Rhododendron myrtifolium*, *Sesleria rigida*.

European network Natura 2000 includes protected areas, in order to preserve biodiversity and socio-economic development.

Bucegi Natural Park has a rich and various flora, including endemic species with different threatening degrees. The special landscapes, the wild relief that join floristic conservation fund and endemic value sometimes unique, are elements that gives originality to "Strungile Mari" Reserve which shows a real science interest.

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SPECII VULNERABILE ÎN FLORA PARCULUI NATURAL BUCEGI

(Rezumat)

Scopul prezentei lucrări îl constituie prezentarea speciilor vulnerabile din flora Parcului Natural Bucegi, precum și a măsurilor de conservare a acestora. Pentru întocmirea lucrării au fost îndeplinite următoarele obiective: caracterizarea geografică, geologică și pedoclimatică a sectorului vestic al munților Bucegi, descrierea categoriilor zoologice și descrierea speciilor vulnerabile, valoarea endemică a speciilor vulnerabile identificate, analiza cormofitei, precum și stabilirea măsurilor de conservare necesare.

În deplasările făcute pe teren în perioada iulie 2011 – iulie 2013, au fost identificate 18 specii vulnerabile, dintre care 10 intră în categoria speciilor endemice, specii care sunt răspândite în ariile protejate din complexul Munților Strunga: Valea Horoabei, Turbăria Laptici, Cheile Tatarului, Strungile Mari, Saua Strunga.

Analiza speciilor vulnerabile a redat o pondere ridicată a hemicriptofitelor conform analizei bioformelor; predomină elementele carpato-balcanice, iar în ceea ce privește factorii ecologici predominante sunt mezofitele, criofilele și speciile slab acid-neutrofile.

Parcul Natural Bucegi cuprinde următoarele tipuri de habitate: habitate de ape dulci, habitate de tufărișuri și pajiști, de stâncării și de pădure. În funcție de fiecare tip de habitat, sunt necesare o serie de măsuri pentru conservare, prevăzute în Rețeaua Natura 2000.

ZOOLOGY

A NOVEL HALOPHILIC ARCHAEON OF *HALOFERAX* GENUS ISOLATED FROM TELEGA (PRAHOVA COUNTY, ROMANIA) ROCK SALT CRYSTALS

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Abstract: This study reports a combined molecular and biochemical characterization of a novel haloarchaeon isolated from rock salt crystal extracted from Telega salt deposit (Prahova County), Romania. The isolated strain belongs to *Haloferax* genus. The strain is a Gram negative rod, and lyses when placed in distilled water or culture medium in the absence of sodium chloride. Colonies grown on JCM 168 culture medium are circular, red-orange, smooth, with elevated surface, and right margins. In addition, this halophile is able to grow in a sodium chloride concentration range of 2 to 5.2 M, with an optimum of 2–4 M salt. The strain grows on media supplemented with magnesium chloride up to 1 M, with optimum growth at 0.7–0.8 M MgCl₂, in the presence of 2 M NaCl. The optimum growth temperature and pH are 38°C and pH 7.5, respectively. Also, the strain is catalase and oxidase positive, and capable to synthesize indol from tryptophan and H₂S from sodium thiosulphate. The strain showed no anaerobic growth, and the nitrate reduction reactions to nitrite and nitrogen contained gases were also absent. Furthermore, this archaeon cannot hydrolyze starch, casein, Tween80 or gelatin. The strain was sensitive to sodium deoxycholate and resistant to chloramphenicol, novobiocin, bacitracin, erithromycin, penicillin, ampicillin and neomycin. The membrane lipid profile contains PGP-Me, PG, PA, S-DGA–1, DGA–1.

Keywords: *Haloferax*, halophilic microorganisms, salt lakes, rock salt, haloarchaea, Telega

Introduction

Saline environments such as salt lakes, subterranean salt crystals, salted soil and brines, are characterized by a high content in NaCl and, thus, offer conditions for growth, multiplication or conservation in dormancy of halophilic microorganisms. These microorganisms pertain to Bacteria and Archaea domains. In addition, the presence of fungi or other eukaryotic microorganisms such as brine shrimp *Artemia salina* (Linnaeus, 1758), brine fly *Ephydra*, photosynthetic flagellates from *Dunaliella*, *Asteromonas*, *Synechococcus* genera, contribute to the biodiversity of these environments. In order to survive in severe conditions of salted environments, halophilic microorganisms used *salt-in* (archaea) or *compatible solutes* (bacteria) strategies [15].

Saline environments, such as salt mines and salt lakes formed at the entrance of former salt mines, are widespread in the Romanian Carpathians' area [7]. Previous studies [6] lead to isolation of members belonging to *Haloferax* and *Haloarcula* genera from these environments, and to the identification of the new species *Haloferax prahovense*, from Telega (Palada) salt lake. Telega village is located in the vicinity of Campina town, in the western part of Prahova County, in a hillock of

sub-Carpathian Mountains, having rivulet Sărata as main water flow. Salt extraction in Telega has been performed by bell type exploitation technology [3, 5] starting before 1685. The extraction continued for more than 330 years, until to 1900, but there are some data that indicated that extraction has been made from old times [3]. After the salt extraction was abandoned, the traditionally tourism based on mineral waters, climateric resorts, cultural–historical and recreational resources, became an economical source for the area [22]. Telega salt deposit (Doftana–Telega) was formed in Neogene [4] and appeared to be a mixture of crystals of various colors from white to grey or swarthy. The deposit has a surface of 2.1 km² and 0.7 km thickness [4].

Extremely halophilic microorganisms require high concentrations of NaCl for their growth, with optimum concentrations of 2.5–5.2 M (15–30%), while moderately halophiles grow optimally in media containing 0.5–2.5 M (3–15%) NaCl [15]. Moreover, halotolerant microorganisms are able to grow in media without NaCl, but also in the presence of high concentrations of NaCl [15].

Halophilic archaea are extremely halophilic microorganisms, classified in the family *Halobacteriaceae*, where various species constitute 40 recognized genera [24]. Among these, the *Haloferax* and *Haloarcula* genera are commonly found in saline environments and best represented. The *Haloferax* genus was defined by Toreblanca *et al.* [21] based on numerical taxonomic study and polar lipid composition on non-alkaliphilic halobacteria. The genus include species growing in media containing 1.0–5.2 M NaCl and high amount of magnesium and species harbor a characteristic lipid composition [12]. Currently this genus is constituted of 12 species comprising *Haloferax volcanii* [13, 21], *Hfx. denitrificans* [19, 20], *Hfx. gibbonsii* [10], *Hfx. mediterranei* [16], *Hfx. alexandrinus* [2], *Hfx. lucentense* [9], *Hfx. sulfurifontis* [8], *Hfx. larsenii* [23], *Hfx. prahovense* [6], *Hfx. elongans* and *Hfx. mucosum* [1] and *Hfx. chudinovii* [17].

The current work presents the characterization of a haloarchaeon isolated from rock salt crystal extracted from Telega salt deposit. This strain belongs to *Haloferax* genus, in accordance with our corroborated molecular and biochemical data according to proposed minimal standard for the description of new taxa in order *Halobacteriales* [14].

Materials and methods

The strain investigated in this work was obtained by courtesy of Dr. Sergiu Fendrihan, being isolated from rock salt crystal from Telega, Prahova county, Romania.

In all experiments the strain was cultivated on JCM 168 medium of following composition (g/l): Bacto casamino acids (5), Bacto yeast extract (5), sodium glutamate (1), trisodium citrate (3), MgSO₄·7H₂O (29.5), KCl (2), NaCl (175.5), FeCl₂·4H₂O (0.036), MnCl₂·4H₂O (0.36 mg). The pH of the growth medium was 7.0–7.2 before autoclaving.

The experiments for Gram-staining, lyses in distilled water, range and optimum growth parameters of NaCl/MgCl₂·6H₂O/pH/T⁰C were in accordance with protocols previously described [6].

Catalase test: 2 ml H₂O₂ were mixed with the loop-contained tested culture after 72 hours of growth on microscope glass slide. The positive response was recorded after 30 minutes if oxygen bubbles were observed.

Oxidase test: a loop-contained tested culture after 72 hours of growth were spread on paper bands containing 1% tetra-methyl-p-phenyldiamine. The positive response was recorded when blue color of paper appeared.

Tests for H₂S from sodium thiosulphate, and indole from tryptophan formation reactions, anaerobic growth in the presence of nitrate, nitrate to nitrite reduction, and producing gas from

nitrite were performed as previously described [6]. Also, the test for starch, casein, Tween80 and gelatin hydrolysis followed previously described methods [6].

Sensitivity to bile salt sodium deoxycholate and antibiotics (chloramphenicol, novobiocin, bacitracin, erythromycin, penicillin, ampicilin and neomycin) was tested according to previously described protocols [6].

The membrane lipids profile was investigated performed using thin layer chromatography [11]. Haloarchaeal cells from 100 ml cultures were used to obtain genomic DNA following the method of Tamaoka [18].

The PCR technique was used to amplify the 16S-rRNA genes, using archaeal specific forward and reverse primers, 5'-TCCGGTTGATCCTGCCG (position 8–24 in *E. coli*) and 5'-GGAGGTGATCCAGCCG (position 1540–1525), respectively. The amplified DNA fragment was sequenced using BigDye Terminator Cycle Sequencing Kit (Pharmacia Biotech) and ABI Prism DNA genetic analyzer (Applied Biosystems) [6].

Results and discussions

The RF1 strain was isolated from rock salt crystal from Telega area, Prahova county, Romania, and provided by courtesy of Dr. Sergiu Fendrihan. The rods cells of investigated strain lyses in distilled water and culture medium devoided of sodium chloride, and showed a Gram-negative staining.

Table 1. Characteristics of *Haloferax* genus members

Properties/ Strains	1	2	3	4	5	6	7	8	9	10	11	12
<i>alexandrinus</i>	+	+	+	+	-	+	+	-	1.7–5.2	4.3	Saltern	A
<i>chudinovii</i>	-	-	+	nd	+	+	-	-	1.2–4.6	2.5–3.0	Silvinite deposit	N
<i>denitrificans</i>	+	+	+	-	-	-	+	-	1.5–4.5	1.5–4.5	Saltern	A
<i>elongans</i>	-	-	+/-	+	+	+	+	+	1.7–5.1	1.7–5.1	Microbial mats	N
<i>gibonsii</i>	+	+	+	+	-	+	+	+	1.5–5.2	1.5–5.2	Saltern	A
<i>larsenii</i>	+	+	+	+	+	+	+	-	1.0–4.8	1.0–4.8	Saltern	A
<i>lucentense</i>	+	-	+	+	-	+	-	-	1.8–5.1	4.3	Saltern	A
<i>mucosum</i>	-	-	-	+	-	-	+	+	1.7–5.1	2.6–3.4	Microbial mats	N
<i>mediterranei</i>	-	+	+	+	+	+	+	+	1.3–4.7	2.9	Saltern	A
<i>prahovense</i>	+	-	+	+	+	+	-	-	2.5–5.2	3.5	Salt lake	N
<i>sufurifontis</i>	+	+	+	+	-	+	+	-	1.0–5.2	2.1–2.6	Zodletone spring	N
<i>volcanii</i>	+	+	+	+	-	-	-	-	1.0–4.5	1.7–2.5	Dead Sea	N
RF 1	+	-	+	+	-	-	-	-	2.0–5.2	2.0–4.0	Rock salt	N

1 = Formation of sulphide from sodium thiosulphate; 2 = Nitrate reduction; 3 = oxidase; 4 = indole from tryptone; 5 = starch hydrolysis; 6 = Tween80 hydrolysis; 7 = Gelatin liquefactions; 8 = casein hydrolysis; 9 = range of NaCl for growth (M); 10 = optimum NaCl for growth (M); 11 = isolation site; 12 = origin of isolation site; “+” = positive; “-” = negative; “+/-” = variable results; nd = no data available; N = natural environment; A = man-made environment

Colonies grown on JCM 168 medium are circular, smooth, having elevated surface with right margins. The colour of the colonies was red-orange. The major differences between RF1 and other members of *Haloferax* genus are detailed in Table 1. RF1 strain was able to grow in a

range of sodium chloride from 2 to 5.2 M, with an optimum in the 2–4 M range. Also, it grew on media supplemented with magnesium chloride, within 0–1 M range, optimum growth being recorded at 0.7–0.8 M magnesium chloride in the presence of 2 M sodium chloride. The investigated strain was sensitive to sodium deoxycholate, and showed resistance to chloramphenicol, novobiocin, bacitracin, erithromycin, penicillin, ampicillin and neomycin. Consequently, the investigated strain should be considered as archaea.

The new isolate grew optimally at 38°C and pH 7.5, in the presence of 50 mM PIPES (Piperazine-N,N'-bis[2-ethanesulfonic acid]) or HEPES (N-2-N-Hydroxyethylpiperazine-N'-2-ethanesulfonic acid). When tested for catalase and oxidase activities, the novel strain showed positive answer in both cases. Indole from tryptophan and H₂S from sodium thiosulphate transformation tests were also positive (Fig. 1). The strain showed no capacity for anaerobic growth in the presence of nitrate, nitrate to nitrite reduction did not occur, and the test for gas producing from nitrite was negative. The extracellular enzymatic spectrum was not represented by amylase, protease (casein and gelatin) or lipase (Table 1). However, the ability of the investigated strain to degrade other substrates cannot be excluded.

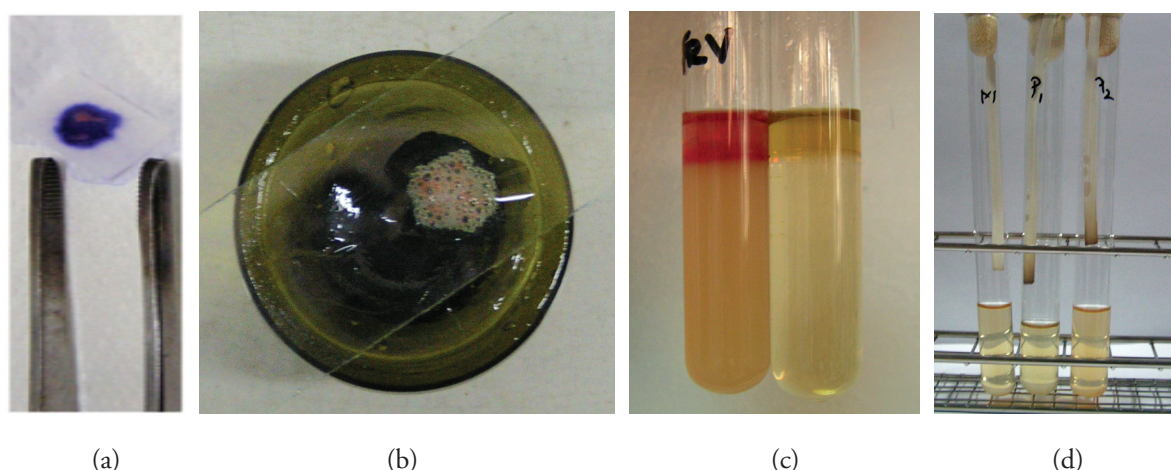


Fig. 1 – Biochemical properties of RF1. The positive results of catalase test (a), indole production from tryptophan (b), H₂S production from sodium thiosulphate (c), and oxidase test (d). All tests are detailed in *Materials and methods* section.

16S-rDNA sequence of RF1 revealed a high similarity percentage with other members of genus *Haloferax*. BLAST analysis showed 99% identity with *Hfx. alexandrinus*, *Hfx. lucen-tense*, *Hfx. sulfurifontis*, *Hfx. chudinovii*, *Hfx. volcanii* and *Hfx. prahovense*. Membrane lipid profile investigation indicated the presence of phosphatidyl glycerol phosphate methyl ester (PGP-Me), phosphatidyl glycerol (PG) and phosphatidic acid (PA) as phospholipids. The glycolipid analysis highlighted the presence of diglycosyl archaeol and its sulfated derivative (DGD-1 and S-DGD-1). Based on these data corroborated with the biochemical properties (Table 1), the investigated strain RF1 appears to be a member of the *Haloferax* genus.

Conclusions

The RF1 strain is a Gram negative rod that lyses in distilled water and culture medium in the absence of sodium chloride. The colonies are circular, red-orange, with smooth and elevated surface, and right margins. This halophile is able to grow in the presence of 2 to 5.2 M (with optimum range of 2–4 M) sodium chloride. When cultivated in 2 M NaCl this strain is capable

of growing in the presence of up to 1 M magnesium chloride, with an optimum at 0.7–0.8 M. The RF1 strain grows optimum at 38°C and pH 7.5, is catalase and oxidase positive, producing indol from tryptophan and H₂S from sodium thiosulphate. No anaerobic growth in the presence of nitrate was recorded. Nitrite is not produced and the test for producing gas from nitrite is negative. In addition, RF1 cannot hydrolyze starch, casein, Tween80 and gelatin. Also, it is sensitive to sodium deoxycholate, and resistant to chloramphenicol, novobiocin, bacitracin, erythromycin, penicillin, ampicillin and neomycin. The membrane lipid profile contains PGP-Me, PG, PA, S-DGA-1, DGA-1. These characteristics suggest that this halophilic strain pertains to *Haloferax* genus.

Acknowledgements

The authors express their warm gratitude to Dr. Sergiu Fendrihan from “The Romanian Bioresource Centre and Advanced Research Association” for help to obtain the strain RF1.

This work was supported by RO1567-IBB05/2013 grant to the Institute of Biology Bucharest.

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**CARACTERIZAREA PRELIMINARĂ A UNUI NOU ARCHAEON
HALOFIL DIN GENUL HALOFERAX IZOLAT DIN CRISTAL DE SARE
DIN ZONA TELEGA (JUDEȚUL PRAHOVA), ROMÂNIA
(Rezumat)**

Prin prezentul articol s-a realizat caracterizarea unui haloarchaeon izolat din cristal de sare prelevat din depozitul de sare de la Telega, prin utilizarea combinată a metodelor moleculare și de biochimie. Noul izolat aparține genului *Haloferax*. Tulpinile de bacili Gram-negative lizează în apă distilată și în mediu de cultură fără clorură de sodiu. Pe mediul de cultură JCM 168 coloniile sunt circulare, de culoare roșu – portocaliu, netede, cu suprafață bombată și margini drepte. Tulpina are capacitatea de a crește într-un domeniu de concentrații de clorură de sodiu de la 2 până la 5.2M cu dezvoltare optimă în intervalul 2–4 M. Tulpina crește pe mediu de cultură suplimentat cu clorură de magneziu până la 1M, creșterea optimă fiind înregistrată la 0.7–0.8M în prezența a 2M NaCl. Noul izolat crește optim la 38°C și pH 7.5, testele pentru catalază și oxidază sunt pozitive, produce indol din triptofan și H₂S din tiosulfat de sodiu. Tulpina nu crește anaerob în prezența nitratului, nu produce nitrit și nu formează gaz din nitrit. Tulpina nu poate hidroliza amidonul, cazeina, Tween80 și gelatina. Tulpina este sensibilă la dezoxicolatul de sodiu și rezistentă la cloramfenicol, novobiocină, bacitracină, eritromicină, penicilină, ampicilină și neomicină. Profilul lipidic membranar este alcătuit din: PGP-Me, PG, PA, S-DGA–1, DGA–1.

DIVERSITY OF THE BEETLE (COLEOPTERA) FAUNA FROM RAPESEED AND ADJACENT FOREST STRIP (SADACLIA, REPUBLIC OF MOLDOVA)

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Abstract: The present paper is a synthesis of the data on the occurrence and autecology of beetles fauna collected from the rapeseed crop and adjacent forest strip in Sadaclia locality (Republic of Moldova). Altogether, from both fields 53 species of beetles belonging to 31 genera and 13 families were identified. The most characteristic for these ecosystems were species from Carabidae and Scarabaeidae families. The most abundant species for rapeseed crop were *Harpalus distinguendus* and *Phyllotreta nigripes*, and for forest strip *Harpalus distinguendus* and *H. amplicollis*.

Keywords: Coleoptera, fauna, ecology, rapeseed, forest strip

Introduction

Rapeseed is one of the most important oilseed crops cultivated around the world, used in both food and technical industries. Rapeseed is used to produce animal feed, vegetable oil for human consumption and biodiesel. During flowering rapeseed is a great source of nectar for honeybees. Worldwide production of rapeseed constitutes 27 million hectares. The top largest areas planted with rapeseed are in China (7.2 million hectares), India (6.9 million hectares), Canada (5.1 million hectares), Germany (1.3 million hectares), and France (1.2 million hectares) [8].

In the Republic of Moldova rapeseed has been grown since 2003. Climate and soil conditions of the republic are favorable for rapeseed cultivation and last years it occupied considerable area, nearly 16000 hectares. Rapeseed prefers cernoziom soils and requires specific water conditions during germination, rosette formation, flowering and fruiting [10].

Rapeseed represents a source of food for a wide range of insects, including beetles, during whole growing season. Extension of area cultivated with different rapeseed hybrids and particularly monoculture favored the appearance of pest outbreaks. Phytophagous beetles are usually controlled by predators. Thus, to maintain rising yields of rapeseeds in conditions of economic and environmental pressures, real knowledge of beetle's fauna of this culture and adjacent forest strips is absolutely necessary.

Preliminary data on rapeseed crops entomofauna diversity in the Republic of Moldova were published by: Bacal [3]; Bacal, Cilipic [4; 5] and Bacal et al. [2].

The aim of our study was to assess the structure of beetles associated with studied crops and adjacent forest strip and to identify the most important pests and in the meantime to indicate the beneficial predators.

Material and methods

An extensive survey was conducted during 2013 in Sadaclia district Basarabeasca, Republic of Moldova (Latitude: 46° 44' 91" North, Longitude: 28° 87' 86" East, Altitude: 74 m) in order to study the distribution, and species diversity of beetles associated with rapeseed crops (*Brassica napus* L.) and adjacent forest strip. Faunistic material was collected using pitfall traps, every 10 days at each site, during spring and summer time. Beetles were identified using available literature [11]. The classification adopted in the article is by Alonso-Zarazaga, Lyal [1] and Bouchard et al. [6]. To process the data on collected materials, different ecological parameters have been used: abundance, dominance, constancy and value of the ecological significance [9]. Sample based rarefaction of the community was considered using the statistic software Biodiversity Pro version 2 [7]. Voucher specimens were deposited in the collection of the Entomological Museum, Institute of Zoology of the Academy of Sciences of Moldova.

Results and discussions

A total of 299 and 202 beetle individuals were collected from rapeseed field and adjacent forest strip, respectively. Altogether 53 species belonging to 31 genera and 13 families were found; 40 species were identified from rapeseed and 37 from forest strip. Of the total revealed species 24 were common for both ecosystems, 16 species were collected only from rapeseed and other 13 only from adjacent forest strip. The largest family proved to be Carabidae, which includes 14 species from 6 genera, followed by Scarabaeidae, with 11 species from 6 genera, Curculionidae with 4 species and 4 genera, Histeridae with 4 species and 3 genera, Tenebrionidae with 3 species and 3 genera, Cerambycidae with 3 species from 1 genus and Chrysomelidae with 2 species and 2 genera. Families Dermestidae, Trogidae and Meloidae had by 2 species from one genus each. Last three families Agirtidae, Coccinellidae and Silphidae were represented by one species each.

On the basis of the calculated ecological parameters we can state, that the most abundant and eudominant for rapeseed crop were species: *Harpalus distinguendus* and *Phyllotreta nigripes*, this two species being also the most characteristic for this crop. Other 4 species (*Opatrum sabulosum*, *Amara aenea*, *A. familiaris* and *Harpalus flavicornis*) were subdominant and the rest of species were recedent. In adjacent forest strip the most abundant and eudominant were species *Harpalus distinguendus* and *H. amplicollis*, being also characteristic to this ecosystem. As dominant species were noticed *Hister quadrimaculatus* and *Opatrum sabulosum*, other 10 species (*Margarinotus purpurascens*, *Phyllotreta nigripes*, *Dorcadion pedestre*, *Trox hispidus*, *Aphodius quadrimaculatus*, *A. distinctus*, *Onthophagus vitulus*, *Gonocephalum pusillum*, *Dermestes lanarius* and *Valgus hemipterus*) were subdominant and the rest were recedent (Table 1).

Table 1: Sinecological analysis of beetle fauna from rapeseed and adjacent forest strip(Sadaclia, Republic of Moldova).

A – abundance, D – dominance index, C – constancy index, W – value of the ecological significance.

Species	A		D (%)		C (%)		W (%)	
	Rapeseed	Forest strip	Rapeseed	Forest strip	Rapeseed	Forest strip	Rapeseed	Forest strip
<i>Agyrtes castaneus</i> F.	1	1	0.3	0.5	5	5	0.02	0.02
<i>Amara aenea</i> (DeG.)	10	4	3.3	2	25	15	0.84	0.3
<i>A. familiaris</i> (Duft.)	8	4	2.7	2	25	20	0.67	0.4
<i>A. similata</i> (Gyll.)	4	-	1.3	-	10	-	0.13	-
<i>Aphodius distinctus</i> (Mull.)	5	5	1.7	2.5	15	15	0.25	0.37
<i>A. luridus</i> (F.)	-	1	-	0.5	-	5	-	0.02
<i>A. quadrimaculatus</i> (L.)	5	7	1.7	3.5	25	30	0.42	1.04
<i>Blaps halophila</i> F.-W.	-	3	-	1.5	-	15	-	0.22
<i>Calathus melanocephalus</i> (L.)	-	1	-	0.5	-	5	-	0.02
<i>Ceutorhynchus pallidactylus</i> (Mrsh.)	1	-	0.3	-	5	-	0.02	-
<i>Coccinella septempunctata</i> (L.)	1	2	0.3	1	5	5	0.02	0.05
<i>Dermestes lanarius</i> Ill.	2	5	0.7	2.5	10	20	0.07	0.5
<i>D. murinus</i> (L.)	1	-	0.3	-	5	-	0.02	-
<i>Dorcadion pedestre</i> (Poda)	3	9	1	4.5	10	25	0.1	1.11
<i>D. scopolii</i> Hbst.	1	1	0.3	0.5	5	5	0.02	0.02
<i>D. tauricum</i> Waltl	1	-	0.3	-	5	-	0.02	-
<i>Epicometis hirta</i> (Poda)	3	3	1	1.5	10	10	0.1	0.15
<i>Gonocephalum pusillum</i> (F.)	-	6	-	3	-	15	-	0.45
<i>Harpalus amplicollis</i> Mntr.	2	22	0.7	10.9	10	40	0.07	4.36
<i>H. atratus</i> Latr.	2	-	0.7	-	10	-	0.07	-
<i>H. distinguendus</i> (Duft.)	143	33	47.8	16.3	80	40	38.26	6.53
<i>H. flavicornis</i> Dejean	7	-	2.3	-	10	-	0.23	-
<i>H. fuliginosus</i> Duft.	5	-	1.7	-	15	-	0.25	-
<i>H. hospes</i> Sturm	4	4	1.3	2	20	15	0.27	0.3
<i>H. neglectus</i> Serv.	-	1	-	0.5	-	5	-	0.02
<i>H. vernalis</i> (F.)	5	2	1.7	1	10	10	0.17	0.1
<i>Hister bimaculatus</i> L.	1	-	0.3	-	5	-	0.02	-
<i>H. quadrimaculatus</i> L.	6	17	2	8.4	20	25	0.4	2.1
<i>Laemostenus sericeus</i> Fischer	-	2	-	1	-	10	-	0.1
<i>Lixus albomarginatus</i> Boh	1	-	0.3	-	5	-	0.02	-
<i>Margarinotus purpurascens</i> (Hbst.)	-	10	-	5	-	40	-	1.98
<i>Meloe proscarabaeus</i> L.	-	1	-	0.5	-	5	-	0.02
<i>M. rugosus</i> Mrsh.	1	-	0.3	-	5	-	0.02	-
<i>Onthophagus furciceps</i> Mrsl.	2	-	0.7	-	5	-	0.03	-
<i>O. kindermanni</i> Hrlld.	-	2	-	1	-	10	-	0.1
<i>O. ovatus</i> (L.)	1	2	0.3	1	5	10	0.02	0.1

<i>O. ruficapillus</i> Brulle	5	-	1.7	-	15	-	0.25	-
<i>O. vitulus</i> (F.)	5	7	1.7	3.5	20	30	0.33	1.04
<i>Opatrum sabulosum</i> (L.)	12	12	4	5.9	25	25	1	1.49
<i>Ophonus diffinis</i> (Dejean)	-	1	-	0.5	-	5	-	0.02
<i>O. schaubergerianus</i> Puel	1	3	0.3	1.5	5	10	0.02	0.15
<i>Otiorhynchus velutinus</i> Germ.	6	4	2	2	20	10	0.4	0.2
<i>Paraphonus mendax</i> (Rossi)	-	1	-	0.5	-	5	-	0.02
<i>Phyllotreta nigripes</i> (F.)	32	9	10.7	4.5	40	30	4.28	1.34
<i>Potosia hungarica</i> Hbst.	2	-	0.7	-	5	-	0.03	-
<i>Psylliodes chrysocephalus</i> (L.)	2	-	0.7	-	10	-	0.07	-
<i>Rhizotrogus aequinoctialis</i> (Hbst.)	1	2	0.3	1	5	5	0.02	0.05
<i>Saprinus cribellatus</i> (Mrs.)	3	-	1	-	5	-	0.05	-
<i>Silpha carinata</i> Hbst.	-	2	-	1	-	10	-	0.1
<i>Stenocarus ruficornis</i> Steph.	2	-	0.7	-	10	-	0.07	-
<i>Trox hispidus</i> Pontop.	1	7	0.3	3.5	5	25	0.02	0.87
<i>Trox sabulosus</i> (L.)	-	1		0.5	-	5	-	0.02
<i>Valgus hemipterus</i> (L.)	1	5	0.3	2.5	5	5	0.02	0.12

The rank-abundance plots show (Figure 1) that three species were dominant (relative abundance >5%) when considering the total capture list (*Harpalus distinguendus* (176 specimens), *Phyllotreta nigripes* (41) and *Harpalus amplicollis* (24)).

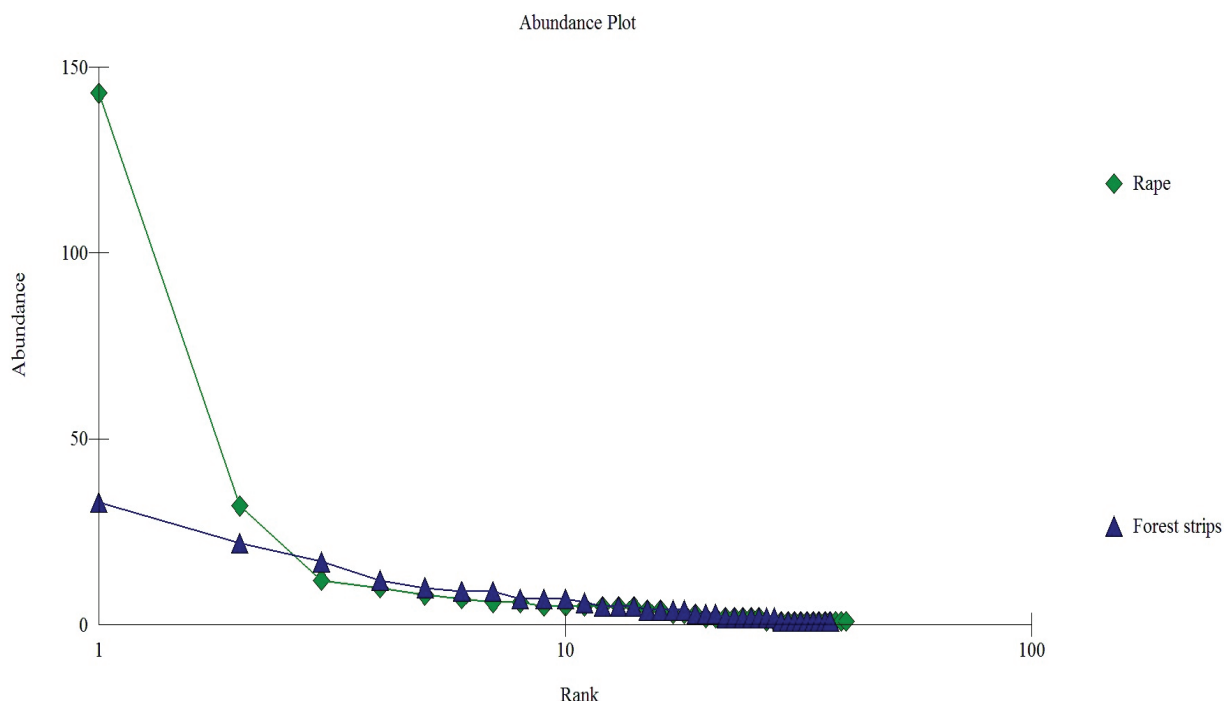


Fig. 1: Species abundance curves for rapeseed and adjacent forest strip beetle cenoses (Sadacilia)

Rarefaction curves for rapeseed crop and forest strip beetle communities are shown in Figure 2. Expected number of species has been plotted against number of individuals. This plot provides a measure of species diversity. Stepper curve indicated that forest strip habitat is slightly

more diverse than rapeseed crop. Both curves are rising and do not yet reach a flat progression, which means that the beetle community has not been recorded completely.

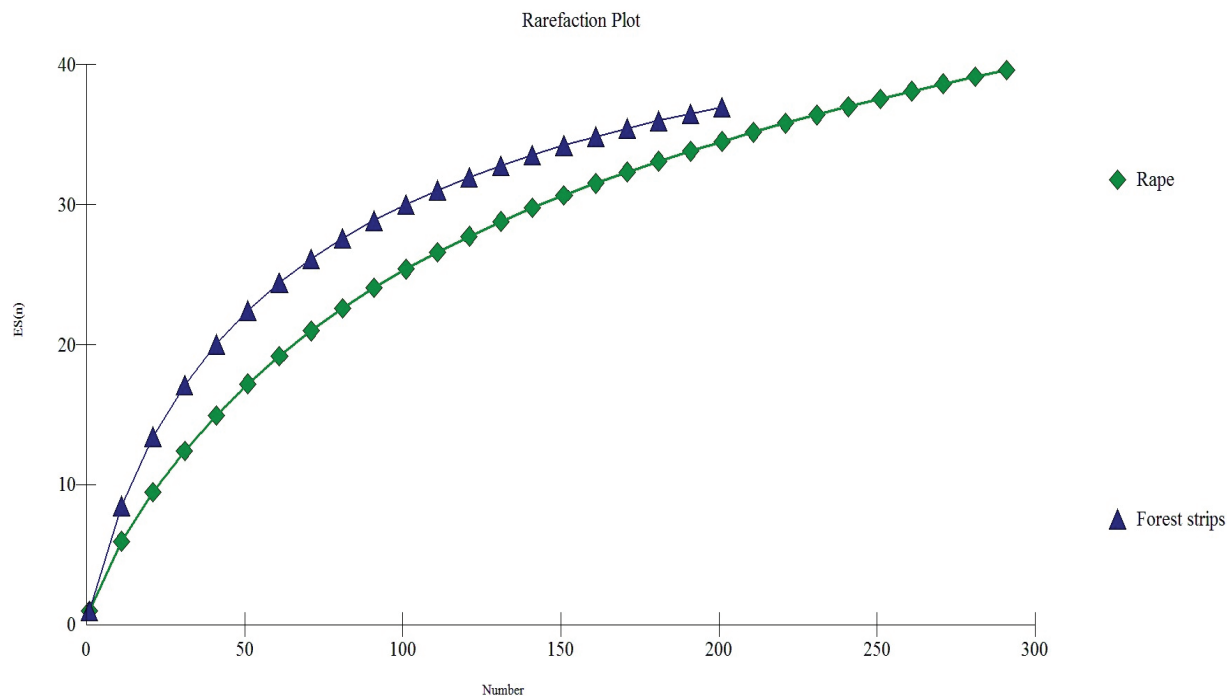


Fig. 2: Rarefaction curves for rapeseed and adjacent forest strip beetle cenoses (Sadacia)

Knowledge of beetle faunal assemblages in ecosystems, their trophic preferences and the ratio between groups is very important, because it can provide useful information on the ecological situation of the ecosystem and its functioning. The revealed beetle community from rapeseed crop was mainly composed by phytophagous (21 species), followed by coprophagous (9), mixophagous (5), saprophagous (3), necrophagous and predators (by 1). Regarding forest strip, beetle community was represented by 17 phytophagous species, 8 coprophagous, 4 mixophagous, 3 predators, 3 necrophagous and 2 saprophagous.

Both ecosystems are populated primarily by phytophagous beetles, among them are known to cause serious damages to rapeseed species *Phyllotreta nigripes*, *Epicometis hirta* and *Psylliodes chrysocephalus*. The number of specimens collected is not alarming at present especially for last two species, but a careful monitoring of adult activity may be required.

It is very important to know the status of predatory populations in agricultural ecosystems and to increase their potential as biological control agents. Only one predator species highlighted for rapeseed crop and other three for forest strip with a low effective number show that ecosystems are trophically unbalanced being anthropogenic affected. Also, a high number of coprophagous beetles caught from forest strip indicate the presence of livestock (cattle and sheep) and degradation of this ecosystem through overgrazing.

Soil processing of the agricultural crops has strong influences on insect complexes, during this period they find refuge to the edge of fields and adjacent forest belts and return back to the field after emergence of the plants when there is enough food. Usually, the fields near the forest strip present a greater fauna diversity, but in this study it was not confirmed.

Conclusions

The aim of this study was to investigate the fauna of beetle diversity from rapeseed, which is an economically important culture, and adjacent forest strip as ecologically significant biotope. As a result of conducted research 53 species of beetles were revealed. The most abundant species for rapeseed crop were *Harpalus distinguendus* and *Phyllotreta nigripes*, and for forest strip *Harpalus distinguendus* and *H. amplicollis*. Species of the Carabidae family, as a typical component of insect complexes, were highlighted.

Acknowledgments

The research was performed within the project 11.817.08.16A funded by Supreme Council for Sciences and Technological Development of Academy of Sciences of Moldova.

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DIVERSITATEA FAUNEI DE COLEOPTERE (COLEOPTERA) DIN CULTURA DE RAPIȚĂ ȘI FÂȘIA FORESTIERĂ ADIACENTĂ (SADACLIA, REPUBLICA MOLDOVA) (Rezumat)

Prezenta lucrare este o sinteză a datelor privind diversitatea și ecologia faunei coleopterelor asociate cu cultura de rapiță și fâșia forestieră alăturată din localitatea Sadaclia (Republica Moldova). În total, din ambele cenoze au fost identificate 53 de specii de coleoptere care aparțin la 31 genuri și 13 familii. Cele mai caracteristice pentru aceste ecosisteme au fost speciile din familiile Carabidae și Scarabaeidae. Cele mai abundente specii pentru cultura de rapiță au fost *Harpalus distinguendus* și *Phyllotreta nigripes*, iar pentru fâșia forestieră alăturată *Harpalus distinguendus* și *H. amplicollis*.

SOME OBSERVATION ON *TROPINOTA (EPICOMETIS) HIRTA* (PODA, 1761) (COLEOPTERA: SCARABAEOIDEA, CETONIIDAE) FROM THE REPUBLIC OF MOLDOVA

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Abstract: Polyphagous insect species *T. hirta* used as a food source more than 70 plants species from 24 families. In certain genera the pests attack all species. In the Republic of Moldova the adults emerge from hibernation in the middle of March. The first specimens were recorded feeding on narcissus flowers, and then the pests move from one fruit trees to another. Adult of *T. hirta* attacks during flowering, so the management of this particular beetle is generally difficult and risky, because it is important to protect the useful insect.

Keywords: insect, pest, plant, management.

Introduction

Scarabaeids are important group of beetles in regard to both systematics and economics. Adults of many species are phytophagous and feed on leaves and flowers of cultural plants [13]. Family Cetoniidae (Coleoptera: Scarabaeoidea) includes several important pests like *Tropinota hirta* Poda, *Cetonia aurata* L., *Protaetia angustata* Ger. etc.

The object of our study was one cetoniin species - *T. hirta*, the most important pest causing damage through feeding on the reproductive parts of flowers of many plants, which are orchard, ornamental trees, bushes, other agricultural and wild plants. As a result, damaged flowers cannot produce fruits. The action was described in literature by several authors [5, 16, 10, 30 etc.]. Among the first observation on *T. hirta* as harmful pest of wheat and mustard were the study of Dobrovolski [8, 9] in Southern Russia beginning from 1895.

T. hirta was cited for the first time in Romania (Transylvania) in 1891 [23] as a pest of fruit trees, cereals and grape. In 1906 [18] the pest attacked the apple orchards in Bessarabia (Republic of Moldova). In the study carried out in 1936 [10], 38 plant species belonging to 13 families were listed as food for *T. hirta*. According to another author [34] *T. hirta* attacks also different forest trees, including *Salix* sp. and *Populus* sp.

The species is widespread in large parts of Eurasia and caused damage in Austria [4]; Bulgaria [7, 21]; Croatia [22]; Hungary [12]; Turkey [20]; Romania [1, 10]; Serbia [25]; Spain [3] etc.

According to literature data the polyphagous adult of *Tropinota hirta* attacks during flowering so the management of this particular beetle is generally difficult and risky, because it

is important to protect the useful insect. During the blooming of trees and crops, *T. hirta* may damage 70% of the blossoms on young cherry trees [15, 22]. Many modern studies include the methods of practical control of this pest using synthetic floral attractant [11, 24, 26–28, 31 etc].

The present study was carried out in the sour cherry orchard and personal garden in the Republic of Moldova.

Materials and methods

The study was conducted between March and June 2014 at the sour cherry orchard with surface of 4 ha and adjacent neighbourhoods covered by whitethorn, drier, locust tree and herbaceous plants; personal garden with different types of trees (apple, apricot, quince, sour and sweet cherry, peach, pear, plums, etc.), berry bushes and herbaceous plants (blackberry, chokeberry, currant, narcissus, raspberry, strawberries, etc.) with surface of 0,7 ha in the central part of the Republic of Moldova.

The specimens of pest were collected manually from the different flowers. The literature data were used also.

Results and discussions

As a result of the personal study and according to scientific publications the species *T. hirta* use as a food source more than 70 plants species from 24 families. In certain types of plant genera like *Brassica*, *Prunus*, *Rosa* the pests attack all species.

Because of the warm winter 2013–2014 the spring came early in the Republic of Moldova and the garden flowers bloom in the middle of March, earlier than usual. The first specimens of *Tropineta hirta* were seen feeding on narcissus flowers in personal garden in March; as a result the flowers were eaten completely. Then, with the beginning of the other plants flowering, the pests resettled and move from one plant species to another (Fig. 1, 2, 3).



Fig. 1: *T. hirta* feeding on Brassica rape flowers.



Fig. 2: *T. hirta* into sour cherry flower.

The species of plants consumed by *T. hirta* according to literature data and personal observation (PO) are listed in Table 1. The list of plant families is given in alphabetical order [33].

Table 1. The list of plants species consumed by *T. hirta*.

Nr.	Plant taxa	Bibliography and personal observations (PO)
	Family Adoxaceae	
1.	<i>Sambucus nigra</i> L.	Schmera et al., 2004
2.	<i>Viburnum lantana</i> L.	Sajó, 1895; Wilke, 1924
	Family Amaryllidaceae	
3.	<i>Narcissus</i> spp.	Aydin, 2011; PO, 2014
	Family Apiaceae	
4.	<i>Heracleum sphondylium</i> L.	Wilke, 1924
	Family Asparagaceae	
5.	<i>Muscari racemosum</i> Mill.	Sajó, 1895; Wilke, 1924; Dumitriu, 1936; Dobrovolski, 1959
6.	<i>Ornithogalum</i> sp.	Sajó, 1895; Wilke, 1924; Dumitriu F., 1936
	Family Asteraceae	
7.	<i>Taraxacum officinale</i> Wigg.	Dumitriu F., 1936; Aydin, 2011; PO, 2014
8.	<i>Tussilago farfara</i> L.	Sajó, 1895; Wilke, 1924; Dumitriu, 1936; Aydin, 2011
9.	<i>Crepis biennis</i> L.	Dumitriu F., 1936
10.	<i>Helianthus annuus</i> L.	Dobrovolski, 1959;
11.	<i>Senecio</i> sp.	Wilke, 1924; Dumitriu F., 1936
12.	<i>Chrysanthemum</i> sp.	Wilke, 1924; Dumitriu F., 1936
13.	<i>Centaurea arenaria</i> Bieb. & Willd.	Sajó, 1895; Wilke, 1924
14.	<i>Matricaria chamomilla</i> L.	Dumitriu F., 1936
	Family Brassicaceae	
15.	<i>Alyssum montanum</i> L.	Wilke, 1924
16.	<i>Brassica rapa</i> L.	Dumitriu F., 1936; Busmachiu, Bacal, 2011
17.	<i>Brassica napis</i> (L.)	Aydin, 2011
18.	<i>Brassica oleracea</i> L.	Aydin, 2011
19.	<i>Capsella bursa pastoris</i> L.	Dumitriu F., 1936
20.	<i>Cardamina pratensis</i> L.	Wilke, 1924; Dumitriu F., 1936
21.	<i>Erysimum</i> sp.	Wilke, 1924
22.	<i>Nasturtium officinale</i> Aiton	Dumitriu F., 1936
23.	<i>Sinapis alba</i> L.	Dobrovolski, 1959
	Family Caryophyllaceae	
24.	<i>Silene</i> sp.	Sajó, 1895; Wilke, 1924
	Family Cucurbitaceae	
25.	<i>Cucumis sativus</i> L.	Dobrovolski, 1951
	Family Fabaceae	
27.	<i>Lupinus</i> spp.	Aydin, 2011
28.	<i>Onobrychis</i> spp.	Dobrovolski, 1959
29.	<i>Pisum sativum</i> L.	Dobrovolski, 1959
30.	<i>Phaseolus</i> spp.	Dobrovolski, 1951
	Family Grossulariaceae	
31.	<i>Ribes nigrum</i> L.	Aydin, 2011
	Family Iridaceae	
33.	<i>Iris germanica</i> L.	Wilke, 1924; Dumitriu F., 1936
	Family Liliaceae	
35.	<i>Tulipa</i> spp.	Wilke, 1924; Aydin, 2011 ; PO, 2014
36.	<i>Gagea</i> sp.	Sajó, 1895; Dumitriu F., 1936
	Family Oleacea	
38.	<i>Syringa vulgaris</i> L.	Dumitriu F., 1936
	Family Orobanchaceae	

39.	<i>Orobanch</i> spp.	Aydin, 2011
40.	Family <i>Plataginaceae</i>	
41.	<i>Plantago maior</i> L.	Wilke, 1924; Dumitriu F., 1936
42.	<i>Plantago media</i> L.	Wilke, 1924; Dumitriu F., 1936
43.	Family <i>Poaceae</i>	
44.	<i>Hordeum vulgare</i> L.	Aydin, 2011
45.	<i>Triticum aestivum</i> L.	Dobrovolski, 1959; Aydin, 2011
46.	<i>Secale cereale</i> L.	Dobrovolski, 1959; Aydin, 2011
47.	<i>Zea mays</i> L.	Dobrovolski, 1951
	Family <i>Primulaceae</i>	
48.	<i>Primula officinalis</i> (L.)	Dumitriu F., 1936
49.	<i>Primula elatior</i> (L.)	Wilke, 1924
	Family <i>Ranunculaceae</i>	
50.	<i>Caltha palustris</i> L.	Wilke, 1924; Dumitriu F., 1936
51.	<i>Pulsatilla patens</i> L.	Wilke, 1924
52.	<i>Ranunculus bulbosum</i> L.	Wilke, 1924; Dumitriu F., 1936
53.	<i>Ranunculus ficaria</i> L.	Wilke, 1924
	Family <i>Rosaceae</i>	
54.	<i>Crataegus</i> sp.	Wilke, 1924; Schmera et al., 2004; PO, 2014
55.	<i>Cydonia</i> sp.	Aydin, 2011; PO, 2014
56.	<i>Fragaria</i> sp.	Dobrovolski, 1959; Aydin, 2011; PO, 2014
57.	<i>Malus domestica</i> Borkh.	Miller, Zubovski, 1906; Böhm, 1950; Aydin, 2011; PO, 2014
58.	<i>Potentilla</i> sp.	Sajó, 1895; Wilke, 1924
59.	<i>Prunus avium</i> (L.)	Kutinkova, Andreev 2004; Razov et al. 2009; PO, 2014
60.	<i>Prunus dulcis</i> Mill.	Aydin, 2011;
61.	<i>Prunus domestica</i> L.	Aydin, 2011; PO, 2014
62.	<i>Prunus spinosa</i> L.	Sajó, 1895; Wilke, 1924; Dumitriu F., 1936
63.	<i>Pyrus communis</i> L.	Aydin, 2011; PO, 2014
64.	<i>Rosa canina</i> L.	Aydin, 2011; PO, 2014
65.	<i>Rubus allegheniensis</i> Porter	Aydin, 2011
66.	<i>Rubus idaeus</i> L.	Aydin, 2011; PO, 2014
67.	<i>Rubus fruticosus</i> agg.	Aydin, 2011; PO, 2014
	Family <i>Rutaceae</i>	
68.	<i>Citrus</i> spp.	Ražov, Barić, Dutto, 2009
	Family <i>Salicaceae</i>	
69.	<i>Populus</i> sp.	Zashev, Keremedchiev, 1968
70.	<i>Salix</i> sp.	Zashev, Keremedchiev, 1968
	Family <i>Scrophularinaceae</i>	
71.	<i>Verbascum</i> L.	Wilke, 1924
	Family <i>Solanaceae</i>	
72.	<i>Solanum lycopersicum</i> L.	Dobrovolski, 1951
	Family <i>Vitaceae</i>	
73.	<i>Vitis vinifera</i> L.	Sajó, 1891; Dobrovolski, 1959; PO, 2014

In spring *T. hirta* adults emerge from hibernation most of the above plant species bloom and, thus, initially, they locate other acceptable hosts. In March such host plants exist mostly in non-agricultural habitats such as pastures and meadows, located close to fruit orchards.

Schmera et al. [24] observed *T. hirta* adults feeding on *Crataegus* sp. and *Sambucus nigra* bushes in meadows. Likewise after the above mentioned hosts have ceased to bloom, *T. hirta* adults must again locate other acceptable hosts.



Fig. 3: *T. hirta* feeding on *Crataegus* flowers.



Fig. 4: Pest insect feeding on *Crataegus* flowers.

During our observations after the bloom period of the cherry trees from the orchard *T. hirta* moved on *Crataegus* flowers located in adjacent neighbourhoods. In the sour cherry orchard *T. hirta* was seen feeding on cherries flowers with other insects such as *Cetonia aurata* (Linnaeus 1758), *Melolontha melolontha* (Fabricius, 1775) and *Protaetia angustata* (Germar, 1817). All species were observed feeding together on *Crataegus* flowers (Fig. 4).

In personal garden last bloomed quince, but the reproductive part of plant have been eaten by pest in button stage before the blooming of the flowers.

Conclusions

Polyphagous species *T. hirta* used as a food source more than 70 plants species from 24 families. In certain plant genera the pests attack all species.

The worm winter and early spring 2014 allow the adults emerge from hibernation in the middle of March in the Republic of Moldova. The first specimens of *T. hirta* were seen feeding on narcissus flowers. With the beginning of the fruit trees flowering, the pests resettled and move from one fruit trees to another.

Adult of *T. hirta* attacks during flowering so the management of this particular beetle is generally difficult and risky, because it is important to protect the useful insect.

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**OBSERVAȚII ASUPRA SPECIEI *TROPINOTA (EPICOMETIS) HIRTA* (PODA, 1761)
(COLEOPTERA: SCARABAEOIDEA, CETONIIDAE) DIN REPUBLICA MOLDOVA
(Rezumat)**

T. hirta este o insectă polifagă, care consumă peste 70 de specii de plante, care fac parte din 24 de familii. La unele genuri de plante dăunătorul atacă toate speciile. În general, în condițiile Republicii Moldova, adulții ies din hibernare la mijlocul lunii martie. Primele exemplare de *T. hirta* au fost observate în 2014 atacând florile de narcis. După înflorirea livezilor, dăunătorul migrează pe pomii fructiferi. Adulții de *T. hirta* atacă în perioada de înflorire a culturilor agricole, din care cauză lupta cu dăunătorul este dificilă, fiind importantă protecția entomofaunei folositoare.

NEW DATA ON THE SPECIES OF CETONIINAE BEETLE/ COLEOPTERA FAUNA (COLEOPTERA: SCARABAEOIDEA: SCARABAEIDAE) IN THE ISLAND OF CYPRUS

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Abstract: This paper aims to contribute to the effort of studying the beetles in the sub-family *Cetoniinae* in Cyprus. The author collected entomological material in April 2011 in the ecosystems close to the shores of the island and on the slopes of the Troodos Mountains. The rich material collected, is composed of about 50 specimens belonging to four cetoniinae species, ie *Netocia afflicta*, *Tropinota (Epicometis) hirta* ssp. *suturalis*, *Oxythyrea noemi* and the endemism *Protaetia (Cetonischema) speciosa* ssp. *marchei*. The first three species occur in early spring at low altitudes, on various flowers, in coastal habitats with rare trees or without any woody vegetation. The last species was found only in the wintering cocoons, *Cetonischema speciosa* ssp. *marchei* being a species related to forest habitats, its larvae developing in the rotten wood of *Quercus infectoria*.

Keywords: cetoniinae, coleoptera, rotten wood, arboreal traps

Introduction

In this paper the results of the entomological material collections made from 15 to 22 May 2011 on the island of Cyprus, especially in the low, coastal areas in the west and south of the island and in the Troodos Mountains are presented. All the collection points are located in the Republic of Cyprus.

Cetoniins are coleoptera insects of medium and big waist. Some of the exotic african species, ex. *Goliathus goliathus* Linnaeus and *Goliathus regius* Klug, are one of the biggest coleopteras ever known, with total length of body up to 113 mm.

Cetoniins are part of the big group of coleopteras from *Scarabaeidae* family which differ from other subfamilies through the border lateral of elytra sinuate. The metasternum also has a median, flat and wide or round anterior extension at the apical part. The dorsal color of the body, more or less shiny, metallic, including the species palearctic.

Materials and methods

The collection of entomological material in Cyprus took place in the south-east of the island, along the Mediterranean coastline. Various ecosystems were investigated by simple observation with the naked eye, such as sandy beaches, rocky cliffs, farmland borders, olive groves, and pastures with sparse vegetation grown on stony soil. In the Troodos Mountains, oak forest clumps of *Quercus infectoria* were inspected, searching the rotten wood in the hollows and in

the humus layer formed under the old tree trunks. In the higher mountain areas, where the *Pinus brutia* forests are dominating, the too early period, characterized by a colder climate, prevented us from finding any cetoniinae. Arboreal traps were installed for *Cetonischema speciosa* ssp. *marchei* in the Troodos Mountains, at an altitude of 760 m, but the too little time we had for inspecting them or the time of the year too early for their observation and collection has not given satisfactory results.

The killing of alive insects was made in acetic ether and their safe keeping in 70% alcohol. The material used for this study is deposited in the private collection of the author.

Results and discussions

Entomological material was collected belonging to 4 species of Cetoniinae, which can be found in various ecosystems in the Isle of Cyprus, in spring.

Netocia afflicta (Gory & Percheron, 1833) is a medium-size cetoniid, characterized by dull dark plum-like (pruineux) upper body, by a large mesosternal process and by rough, dense punctuation. Numerous types of color, from dark green to copper or dull black, have been described in the literature. The specimens collected by us are characterized by a large body: the largest specimen was 24.5 mm long/14.2 mm wide, the medium-size one was 22.2 mm long/13.3 mm wide, and the smallest one 22.1 mm long/11.8 mm wide. Dull black colour or slightly shiny on the upper side or shiny black or bluish colour on the lower part are typical with the species (Fig. 1 & 2). The specimens taken for comparison, namely those from the Dalyan area, in northeastern Anatolia, are characterized by black-greenish colour on the upper side, small white spots on the backside of the elytra and pygidia, shiny dark green on the bottom (Fig 3 & 4), and the larger body is 25.4 mm long/14.7 mm wide, the medium-size one 22.5 mm long/13.2 mm wide, and the smallest one 21.6 mm long/12.6 mm wide. Specimens from Dalyan were also collected at lower altitudes, close to the seashore ecosystems. The specimens belong to the *titea* variation [5].

The specimens we have collected recently in northwestern Jordan are characterized by bluish black color on the dorsal side of the body, usually without any white spots, and with a dark indigo blue gloss on the ventral side (Fig. 5 & 6) and their body size is comparable to the size of the specimens we found in Cyprus.

Netocia afflicta is a common species of cetoniinae, very common in Anatolia and the Levant, and may even be abundant on the east coast of the Mediterranean Sea, in areas where trees are absent or very rare. It is spread from mainland Greece, through Peloponnese and Attica, throughout all the islands of the Aegean. Along the Mediterranean coast, in the Levant, it reaches down to Palestine, East Jordan, Gaza strip and even to Mount Sinai (from the monastery of Saint Catherine). It was reported in some areas of the Arabian Peninsula (area of Taif), Yemen. [5]

Larvae develop with species of *Cirsium*, *Echinops* and *Onopordon*, being more frequent in the lowlands close to the seashore. Adults appear in spring, from April to July and are found on the stems of plants, feeding on the juice dripping from the wounds caused by insects (Fig. 7). About 40 specimens were collected in Paphos, Polis and the Akamas peninsula.

Tropinota (Epicometis) hirta ssp. *suturalis* (Reitter, 1913), is a small cetoniid.

Tropinota hirta ssp. *suturalis* is widespread in Anatolia, Syria, Lebanon, Israel and the Mediterranean islands, close to Anatolia and the Caucasus.

The larvae develop in rotting vegetable compost on the soil and adults occur in the months of April and May, it being a springtime species. It occurs on the *Rosaceae* inflorescences

as well as on shrubs such as *Viburnum lantana* and *Genista scorpius*. The adults feed on pollen, stamens and pistils of flowers (Fig. 8). It may be harmful to fruit trees flowers, when they occur in large numbers.

We found one specimen near Paphos, a flower of Rosaceae, at about the seashore level.

Tropinota hirta ssp. *suturalis* differs from the typical form, by the margin of clypeus strongly concave between the angles dented, by the border of the pronotum with an edge often smoothed stopped by the punctuation, the scutellum punctate along the borders almost to the apex. The first elytral interstria is more or less raised along the sutura with, behind, a narrow and deep furrow against the joining, and with the teguments of the upper surface shining. The antenna club of the male is of the same length of the female. The spots of elytra are generally white and arranged transversely [2].

Oxythyrea noemi (Reiche & Saulcy, 1856)

It is a small cetoniid. The pronotum has six white spots arranged in two parallel rows. Sometimes the pair of spots may be absent from the head side. The white side border of the pronotum is often interrupted. It has many white spots on the elytra, which are smaller and less visible than the ones of the larger species, *Oxythyrea abigail* (Reiche & Saulcy, 1856). These spots have irregular contours, they are not round and they tend to join towards the apex of the elytra. The ventral part of the abdomen has three white side spots with the females and 5 spots with the adults.

Oxythyrea noemi is widespread in Cyprus, Lebanon, Syria, Israel, Jordan, Turkey and Egypt (Sinai) [3]. *Oxythyrea noemi* larvae develop in the vegetable compost in the sandy areas. Adults are found in April and May on the flowers of plants belonging to the family *Brassicaceae*, *Asteraceae* Fig., *Apiaceae*, and less often on other plants. We found several specimens on inflorescences of *Asteraceae* (Fig. 9) near the sea beaches: in Polis, Paphos and Pissouri.

Protaetia (Cetonischema) speciosa (Adams, 1817).

It is a large cetoniid, 20–32 mm long. It differs from other *Protaetia* having large and broad build, borders of the pronotum entirely margined, the elytra without longitudinal depression in the posterior half in the vicinity of the suture, and mesosternal process almost smooth, broad or with very scattered and non pubescent punctuation [4].

Cetonischema speciosa is widespread in Eastern Turkey, Syria, Lebanon, Iran and western Afghanistan. Being spread over such a large area, many distinct forms have been described, which were regarded as subspecies, generally differing in body color, from green to black, through shades of red and blue. Besides, the color of the pronotum can be red and the elytra are blue-green with *Cetonischema speciosa* ssp. *jousselini* (Gory & Percheron, 1833).

The subspecies *Cetonischema speciosa* ssp. *marchei* (Alexis & Delpont, 1999) was described in Cyprus which is endemic to this Mediterranean island [1].

Cetonischema speciosa is rather related to old forests, the larvae developing in the rotten wood of the tree hollows, and, when the former is missing, in various vegetable composts. In areas south of this area where the forests have disappeared, there have been reports older than 50 years. In Israel and northern Lebanon the species is rarely met in the oak forests (Andre Kairouz, personal report).

In Cyprus, we found a few specimens of *Cetonischema speciosa* ssp. *marchei* in the cocoons we dug out from the rotted wood and leaf layer beneath a *Quercus infectoria* oak, in the protected oak area of Pano Panagia (Fig 10). The color of the specimens is blue-green, with an oily tinge. (Fig. 11).

The author wishes to thank Mr. Erodotos Kaouris Bsc (Hons) from the Forest Management Msc. Biodiversity Conservation & Management, Cyprus, for the information on forest habitats of the Troodos Mountains, as well as for the necessary steps he took for us to obtain a permit to collect insects.

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NOI DATE FAUNISTICE PRIVIND SPECII DE COLEOPTERE CETONIINAE (COLEOPTERA: SCARABAEOIDEA: SCARABAEIDAE) ÎN INSULA CIPRU (Rezumat)

Această lucrare dorește să aducă o contribuție la efortul de studiere al coleopterelor din subfamilia *Cetonninae* din Republica Cipru. Autorul a colectat material entomologic în luna aprilie 2011 din ecosistemele din preajma țărmurilor insulei și de pe pantele munților Troodos. Materialul bogat colectat, compus din circa 50 exemplare aparține la 4 specii de cetoniinae și anume: *Netocia afflicta*, *Tropinota hirta* ssp. *suturalis*, *Oxythyrea noemi* și endemismul *Cetonischema speciosa* ssp. *marchei*. Primele trei specii apar primăvara devreme la altitudini joase, pe diferite flori, în habitate costiere cu arbori rari, sau lipsite de vegetație lemnoasă. Ultima specie a fost găsită doar în coconii de iernare, *Cetonischema speciosa* ssp. *marchei* fiind o specie legată de habitatele forestiere, larva dezvoltându-se în lemnul putred al stejarilor *Quercus infectoria*.



Fig.1: Petru Vasile Istrate. *Netocia afflicta*
Polis, Cipru 04. 2011. Upper side of body



Fig. 2: Petru Vasile Istrate. *Netocia afflicta*
Polis, Cipru 04. 2011. Lower side of body



Fig. 3: Petru Vasile Istrate. *Netocia afflicta*, 06 2006
Dalyan, Turcia. Upper side of body



Fig. 4: Petru Vasile Istrate. *Netocia afflicta*,
05. 2006, Dalyan, Turcia. Lower side of body



Fig.5: Petru Vasile Istrate, *Netocia afflicta*
04. 2014 Umm Quais, Iordania.
Upper side of body



Fig. 6: Petru Vasile Istrate, *Netocia afflicta*
04. 2014 Umm Quais, Iordania.
Lower side of body



Fig. 7: Petru Vasile Istrate. *Netocia afflicta* feeding on sap dripping from the thistle stem wounds, near Polis



Fig. 8: Petru Vasile Istrate. *Tropinota hirta ssp. suturalis*, Madaba, Iordania



Fig. 9: Petru Vasile Istrate. Paphos, Cipru, a specimen of *Oxythyrea noemi* feeding on floral parts of a compositae plant



Fig. 10 : Petru Vasile Istrate. Pano Panagia, Cipru. Specimens of *Quercus infectoria*, a habitat for *Cetonischema speciosa*



Fig. 11: Petru Vasile Istrate. *Cetonischema speciosa* in cocoon, protected oaks from Pano Panagia

NEW DATA ON LARVAL DEVELOPMENT AND SPREAD OF THE SPECIES *CALLERGATES GAILLARDOTI*, CHEVROLAT, 1854 (COLEOPTERA, CERAMBYCIDAE) IN THE ISLAND OF CYPRUS

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Abstract: This paper aims to contribute to a better knowledge of the biology of the species *Callergates gaillardoti*, a Capricorn beetle (*Cerambyx*) from the *Prioninae* subfamily and to extend the area of distribution of this species in the Middle East. Several larvae were collected from a trunk of *Pinus brutia*, in the Troodos Mountains, Cyprus. We have brought them to Romania and reproducing their natural living conditions we surveyed the larval development and the recorded the adult emergence. Information was obtained about the chamber position within the trunk, the materials used in building its walls, the shape and size of the adult emergence gallery and the adult emergence period under the specified artificial growth conditions.

Keywords: prioninae, dead wood, pine, gallery exit

Introduction

Callergates gaillardoti (Chevrolat, 1854) is a Palestino-Taurian element belonging to the family *Cerambycidae*, the *Prioninae* subfamily, being first described by Chevrolat in 1854 [1], based on specimens found close to Saida / Sidon, Lebanon.

It is spread in the Middle East, being reported in Turkey, Antalya, Adana (Adlbauer, 1988; v. Demelt 1963) and Icel (ŠvÁcha & Danilevsky, 1986), Lebanon (Chevrolat, 1854), (Sama & Rapuzzi, 2000), Syria, (Rejzek et al., 2003) and the Asian countries. In Europe, it was only found in Greece, the Rhodes islands, Samos (Welnicki & Przewozny) [4] and Lesbos (Drumont & Dauber, 2011), [2] which are very close to the coast of Anatolia. It has also been reported in western Cyprus (Sama, 1994).

The species *Callergates gaillardoti* belongs to the *Callergates* genus, Lameere 1906, being closely related to *Ergates*. Both types have only one representative. The genus *Ergates* includes the species *Ergates faber*, Linnaeus, 1767, spread over a larger area, Western Palearctic or Turano-Europeo-Mediterranean, which includes Europe, extending east to Transcaucasia, North Africa, Turkey, Syria.

Callergates gaillardoti differs from *Ergates faber* in several morphological characters, such as length of the first antennal segment, which in case of *Callergates gaillardoti* goes beyond the lower edge of the eye, which does not occur with *Ergates faber*. Besides, with the first species the third antennal segment is thickened and provided with denticles. This is missing with *Ergates faber*. The pronotum has thorns / prickles on the lateral side of *Callergates gaillardoti*, and is devoid of thorns with *Ergates faber*. [3]

Besides, the body of *Ergates faber* is more rounded, the head is larger and the more polished appearance of the dorsal surface of the *Callergates gaillardoti* is missing.

The larvae of both species develop in the dead wood of pine-trees. In Anatolia and north-western Syria, where both species overlap in the area, the insects occupy the same habitat. They are present in the high-altitude pine forests. In Lebanon, it was reported in Bcharre in northern Lebanon, in the forests of *Pinus brutia*, at 1225 m, in Turkey, in the Nurdaglari Mountains, near Dorytöl, in forests of *Pinus brutia*, at 950 m, in NW Syria, the Kassab area, near Latakia, in *Pinus halepensis* forests and in Cyprus, in Stavros tis Psokas, in forests of *Pinus brutia*, at about 1000 m altitude.

Materials and methods

The collection of entomological material was performed between 15 and 24 April 2011 in the southern part of the island, which is now part of the Republic of Cyprus. The vegetation and the fauna of the island are rich and the anthropic influences are less felt here than in the other Mediterranean islands. The Troodos Mountains are covered with pine forests, of which *Pinus brutia* is the most impressive, the trunk of the old trees being more than 1.4 m in diameter, being propitious to the development of large beetle insects (coleopteran). This conifer is found up to 1200 m, and even up to 1500 m high, on the sunny slopes. Other conifers may be met, too, such as the Aleppo pine, *Pinus halepensis*, at low altitudes, the Cyprus cedar, *Cedrus brevifolia*, endemic to the island, which occupies small areas at 1100–1200 m, in the cedar valley. The juniper, *Juniperus foetidissima* and the black pine, *Pinus nigra* are found higher up than 1200 m. Among deciduous trees (hardwood), the golden oak *Quercus alnifolia*, an endemic small tree, is met more frequently, while the massive Aleppo oak, *Quercus infectoria*, is a species of low altitude, now very much endangered. The strawberry tree, *Arbutus andrachne* is an unusual presence because of its crimson colored crust. Many shrubs such as the myrtle and the laurel, alongside the impressive sycamore, *Platanus orientalis*, rather grow in the wetter valleys.

Several areas of natural forests of *Pinus brutia* (Fig. 1) were identified, located in the western part of the Troodos Mountains, at altitudes of 800–1200 m, where large specimens were very frequent. Stavros tis Psokas, a forest resort with a camping made of spacious houses, is a landmark located about 5–6 km south of where the larvae were found. The stumps containing *Callergates gaillardoti* larvae were recognized due to the oval shaped insect emergence galleries. A number of 8 larvae in various development stages were only found in one stump (Fig. 2), about 1000 m above the sea level. The 1st stage larvae were found between the bark and the wood and the 2nd and 3rd stage larvae – within the wood (Fig. 3). Numerous larvae tunnels were observed, as well as a dead male specimen, which we found in the pupal chamber.

During the collection of larvae, in a stump about 80 cm in diameter, buprestidae (jewell beetle) and a 15 cm long scolopendra were found. Larvae were temporarily kept in two containers of 2 liters each, containing rotten bark peeled of the trunk, and they were brought to Romania, where we surveyed their development. For this we used two plastic containers 29 cm long, 29 cm broad and 32 cm high, into which were drilled several 0.8 cm ventilation holes, including into the cover. The forest pine stumps logs we used resulted from trunks fallen to the ground. Both stumps were rotten to a certain extent, while the center, the core of the wood was unaffected. The two stumps were 23 cm in diameter and the 28 cm high. Each of them was placed on a bed of fine wet sawdust. Several holes were made in each stump, in which the larvae were introduced together with an amount of wood from their natural habitat. We surveyed the developing of larvae which occurred while excavating large quantities of sawdust in order to dig their galleries.

Some of the larvae left the wood and dug galleries at the bottom of the stump, continuing to develop there. Two months later the first adult, a male, appeared (Fig. 4).

In order to create natural conditions, during winter the containers were kept at low temperatures, even below the freezing point, when the larval development stopped.

The following year, in 2012, three insects came out, a male and two females, in the interval between early May and late July.

One of the stumps has produced three adults and the other one, just one adult. Each adult has gone through a separate gallery, removing the bark cover. Three of the larvae produced no adults and died or the adults were not able to leave the pupal chambers.

The first stump had only one emergence gallery, and the second one, three galleries. As the first stump was in a very advanced stage of decay, in mid-March 2014, we analyzed only the second stump. The latter presented three emerging galleries, elongated oval in shape (Fig. 5), with dimensions of 5.5 cm long / 1.2 cm wide and 5.5 cm long / 2 cm wide. The third was 4 cm long and 2 cm wide. The gallery exit had the sides parallel to the trunk axis, in all the three cases. Later on, after splitting the trunk, it was found that the three pupal chambers were located within the bark, right on the edge of the trunk core, which left untouched. The oval pupal chambers contained very fine sawdust and scrap droppings at the base, up to 10 cm thick, well-pressed, over which there was a layer of coarse sawdust made of bark chips broken by the larvae before turning into pupae (Fig. 6). A tunnel 8–10 cm long led from the pupal chamber to the trunk outlet of the gallery.

Results and discussions

Four specimens of *Callergates gaillardoti* were obtained from eight larvae collected from natural forests of *Pinus brutia*, in the Troodos Mountains, Cyprus. Our success ratio was 50%. Adult size was between 60–62 mm, which was the maximum length between the mandible tips and antennae tips.

It turned out that large Coleoptera Cerambycidae can be obtained, too, under laboratory conditions, if certain measures are observed, concerning the faithful reproduction of natural conditions, i.e. similar sublayer – rotten coniferous wood-related species, pine wood. Providing low humidity and a midwinter diapause by placing the containers in cold climate is very important.

By faithfully reproducing the natural development conditions, adult palearctic and tropical coleoptera species most difficult to collect, such as scarabaeide, buprestidae, cerambycidae were obtained, to mention just the most important ones.

Callergates gaillardoti cerambycide is considered a representative species for the Eastern Mediterranean area, one of the largest palearctic species, the adults reaching a length of 6.5 cm and therefore a bio-indicator species for natural old conifer forest habitats, especially pine wood forests.

The rarity of the species and the success in obtaining these four specimens, which are unique in the Romanian collections, is a great entomological achievement.

The author wishes to thank Mr. Erodotos Kaouris Bsc (Hons) from the Forest Management Msc. Biodiversity Conservation & Management, Cyprus, for the information on forest habitats of the Troodos Mountains, as well as for the necessary steps he took for us to obtain a permit to collect insects.

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NOI DATE PRIVIND DEZVOLTAREA LARVARĂ ȘI RĂSPÂNDIREA SPECIEI CALLERGATES GAILLARDOTI CHEVROLAT, 1854 (COLEOPTERA, CERAMBYCIDAE) ÎN INSULA CIPRU (Rezumat)

Această lucrare dorește să aducă o contribuție la cunoașterea biologiei speciei *Callergates gaillardoti*, croitor din subfamilia *Prioninae* și la completarea ariei de răspândire a speciei în Orientul Mijlociu. Au fost colectate mai multe larve dintr-un trunchi de *Pinus brutia*, Munții Troodos, insula Cipru. Au fost transportate în România și reproducându-se condițiile naturale, li s-a urmărit dezvoltarea larvară și a fost consemnată apariția adulților. Au fost obținute informații legate de poziția camerei pupale în trunchi, materialele folosite în confecționarea pereților acesteia, forma și dimensiunea galeriei de emergență a adultului, perioada de emergență a adulților în condițiile specificate de creștere artificială.



Fig. 1: Petru Vasile Istrate. Mature forest of *Pinus brutia*, Stavros tis Psokas, the Troodos Mountains, Cyprus



Fig. 2: Petru Vasile Istrate. *Pinus brutia* trunk with multiple galleries for the emergence of adult *Callergates gaillardoti*



Fig. 3: Petru Vasile Istrate. *Callergates gaillardoti* larva in stump of *Pinus brutia*



Fig. 4: Petru Vasile Istrate. *Callergates gaillardoti* male emerging from the pupal chamber in early June 2011



Fig. 5: Petru Vasile Istrate. Emergence gallery in a *Pinus sylvestris* stump



Fig. 6: Petru Vasile Istrate. Pupal chamber of *Callergates gaillardoti* paved with coarse sawdust and excrement compacted on top

PALEONTOLOGY

ABOUT THE FORMER PRESENCE OF THE GREAT BUSTARD IN PRAHOVA AND BUZĂU DISTRICTS

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Abstract: The Great Bustard is the most robust bird in Romania's fauna. In Prahova district, the species became extinct in the 1950s, in Buzău district the last specimens were seen in 1983.

Keywords: *Otis tarda*, L. 1758, extinction, Prahova and Buzău districts, Romania.

Introduction

The Great Bustard (Order Gruiformes, family Otitidae) is the most robust bird in Romania's fauna. Until 30 years ago, the symbol of the steppe, had lived in the two counties (Sărata Plain – Prahova and Central Bărağan and Râmnic plains – Buzău) at altitudes of 50–90 m.

Materials and methods

The data have been collected in a survey among hunters and locals, as well as from the archives of cynegetic institutions.

Results and discussions

Prahova district

Rather small flocks of Great Bustard used to populate only the south-eastern parts of the county, the largest group (34 specimens) being observed near Colceag Village on January 13, 1929.

The biggest male Bustard (17 kg) was shot dead (by a hunter from Ploiești City), on the territory of Sălciile Commune in the spring of 1935 (Soare, 1942).

The Report No. 32 of January 30, 1939 sent by the Prahova district Hunting Inspectorate to the Ministry of Agriculture and Land Fund outlined that the restrictions imposed on hunting this bird led to its proliferation the glazed frost of December 1938 affecting the flock. The Prahova Hunting Inspectorate intervened from the very first snowdays at the local gendarme posts of Fulga, Ciorani, Sălciile and Adâncata communes "where whole flocks of Great Bustards were gathered, asking them to oversee the locals lest they should catch the birds on the glazed soil". For all that, the inhabitants of Ciorani and Sălciile villages "did catch a large number of Great Bustards from the fields, clubbed them to death, took them home and pickled them" (Ploiești National Archives, Prahova district Hunting Inspectorate, Dos. 1/1939, folio 314).

Observations made in the interval of April 8–18, 1939, identified the presence of Great Bustards in the area extending between the villages of Parepa and Fulga (7 specimens), on the meadow between Ciorani and the homonymous railway station (5 specimens), in the territory of the area of Coslegi Commune (4 specimens) and of Parepa Village (3 specimens).

Between August 1–15, 1939 five Bustards were seen in Sălciile Commune, 11 in the fields between Ciorani and Sălciile, and 8 in the territory of Drăgănești Commune.

On February 12, 1939 8 birds were caught by the people of Sălciile.

During the hunting season April 1, 1939 – March 31, 1940 two birds had been hunted in this district.

From 1938 to 1940, a few groups, formed of 1–3 individuals each, were singled out in the area extending between the villages of Inotești and Ceptura.

In order to prevent their being captured by the locals on glazed frost days, the Ministry of Agriculture and Land Fund sent (November 26, 1941), the Prahova Hunting Inspectorate 90 posters (kind of warning bills today) to be distributed as follows: 20 copies in Fulga and Ciorani communes; 15 copies in Sălciile and Drăgănești communes and 10 copies in Parepa and Conduratu communes.

Apart from bill posting, the Inspectorate ordered that the texts be made known to the villages also by drum beats (many locals being illiterate!) (Ploiești National Archives, Prahova County Hunting Inspectorate, Dos. 1/1940, folio 67).

In 1941, a few birds were shot in Ciorani Commune.

In 1943, “a reasonable number of Great Bustards” existed in the Ciorani-Fulga-Parepa region, in “an untitled or little titled area, grass-rich and not trodden by man” (Oprișiu, 1943, p. 401). The same author noted that “no special local protection measures had been taken so far”, although they would have been necessary because the birds were in great suffering since the ice set on the wings prevented them from flying. In the winter of 1939/1940, ice on the wings stopped them on the ground, so they all were killed by the locals” (p. 401).

On April 22, 1943 the Ministry of Agriculture and Land Fund approved the shooting of 4 Bustards on the territory of Parepa, Ciorani, Fulga, Sălciile, Băraitaru and Inotești communes. In the years 1946–1948, Bustards did exist also in Sălciile Commune (south-east end of the district); it was dry weather and the birds would seek the near-by Ratca Pool, which was in Ialomița district (Geacu, 2001).

Buzău district

At the end of the 1930s, the species was observed in the south of the County, in significant numbers, an assertion supported by the fact that the glazed soil of December 22–23, 1938 had facilitated the poaching of 297 birds by 76 culprits, 39 of them killing 132 birds mostly on the territory of Padina Commune (south-east end of the county), two locals killing 30 Bustards on December 23, 1938. A peasant and his son from Scutelnici Commune caught then 50 birds “selling part of them to other locals, the rest being salted” (Comșia, 1939, p. 102). All these individuals were acquitted by the Pogoanele Court.

In the 1930s–1940s, in the field between Țintești and Albești villages, the flocks of Great Bustards numbered 3–4 specimens each.

In 1943, a few flocks were seen in the villages of Amara (Ghergheasa Commune), Nicolești (Puiești Commune) and Roșioru (Cochirleanca Commune).

On April 20, 1943, Basile Chefneux, Head of the Royal Hunts, requested permission from the Buzău Hunting Inspectorate to hunt five Bustards on the territory of Rușetu Commune.

On May 14, 1943 a few specimens were hunted in the Baba Ana-Amaru area. The Ministry of Agriculture did approve the catching of 15 birds in Buzău County for the hunting season April 1, 1943-March 31, 1944.

The inspections made by the Buzău Hunting Inspectorate between June 17–24, 1944 found a “rich and increasing” Bustard population.

In 1944, Cilibia Village had a Hunting Society named just “Dropia” (The Great Bustard).

Between April 1, 1945 and March 31, 1946 the County had only 14–15 Great Bustards. A Report of the Buzău Hunting Inspectorate sent to the Ministry of Agriculture mentioned that “a somehow larger number of Great Bustards were observed and surveillance convinced us that their number was on the increase in the interval of April 1, 1946 – March 31, 1947” (Buzău National Archives, Buzău Hunting Inspectorate, Dos. 17/1948, folio 9).

In 1948, the species area was limited to Scutelnici (Metaleu)-Arcanu-Pogoanele-Padina communes in the south of the district. Until around 1950, Great Bustards could be seen also on the field between Cioranca and Limpeziș villages.

The Bucharest Hunting Economy Direction “planned” the hunt of 10 males in this County, between April 1, 1948 and March 31, 1949.

Annually, about 10 Great Bustard flocks, the largest with 10–15 specimens, could be noticed in the field between the villages of Baba Ana (Buzău County), Boldești and Fulga (Prahova district) until 1950. They used to stay in the *Brassica* fields, a plant that had started to be grown in the years of the Second World War. In the 1940s, the bird had several nests in this field, even village children could find them (eg. those in the small village of Lacul Sinaia). Very few Bustards still existed in the droughty years 1946–1947, the last pair being seen in that field in 1952.

Roundabout 1940, birds existed also in Lunca Banului Commune.

Before 1950, a number of 6–7 or even 10 birds lived in Scutelnici Commune, the last Great Bustard specimens being hunted in 1950 and 1951.

Worth-noting, former landowners valued and protected these birds.

In the 1950s, in the area extending between the villages of Padina, Tătulești and Rușești Great Bustard flocks numbered 4–5 individuals each, the last 7 being seen in the Fall of 1961.

A Great Bustard bird was hunted in the Brădeanu-Scutelnici area in 1961. Later, in 1970, a Great Bustard was seen on the territory of C. A. Rosetti Commune.

In the Padina area (south-east end of the district), the last Great Bustards were observed in 1973–1974.

In Buzău County, the last birds (3 Great Bustards) were discovered east of Limpeziș Village (between Buzău and Urziceni) in the spring of 1983.

Conclusions

The Great Bustard has disappeared primarily because of poaching.

Other causes were: changes of habitat after the land expropriation in 1945 and 1949, when large properties (with vast and homogeneous fields that provided the quiet and the best living conditions needed by this bird) were fragmented, deeply affecting the Great Bustards environment.

The drought of 1946 and especially the blizzard of February 1954, the biggest in the south of Romania, led to the disappearance of the species from over 95% of the areas occupied by it.

In Prahova district, the species became extinct in the 1950s, in Buzău district the last specimens were seen in 1983.

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DESPRE DROPIILE CARE AU EXISTAT ÎN JUDEȚELE PRAHOVA ȘI BUZĂU (Rezumat)

Drobia – pasărea simbol a stepei – s-a întâlnit pe teritoriile de câmpie ale celor două județe – Prahova (Câmpia Săratei) și Buzău (Bărăganul Central și Câmpia Râmnicului).

Dispariția acesteia a fost în primul rând urmarea braconajului. Se adaugă apoi modificările de habitat rezultate în urma exproprierilor din 1945 și 1949, când marile proprietăți (ce aveau culturi întinse și omogene ce asigurau liniște și locuri optime de trai pentru dropii) au fost fragmentate, mediul de viață al dropiilor a fost profund afectat.

Seceta din 1946, dar mai ales viscolul din februarie 1954, cel mai mare din sudul României, au determinat dispariția speciei în peste 95% din arealele ocupate.

În județul Prahova extincția speciei s-a constatat în anii `50 ai secolului XX, iar în județul Buzău ultimele exemplare s-au observat în anul 1983.

MUSEOLOGY

VALORISING MUSEUM HERITAGE WITH TEMPORARY EXHIBITIONS OF NATURAL SCIENCES DEPARTMENT OF MUREŞ COUNTY MUSEUM, 2013

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Abstract: The department of Natural Sciences of the County Museum held, at its premises at no. 24, Horea Street, and at the University of Medicine and Pharmacy of Târgu-Mureş, five thematic and collection temporary exhibitions on various cultural events included in the Plan of Activities of the Museum for 2013.

All these exhibits were entered into the cycle of capitalization of the rich and precious exhibition heritage of the Museum, totaling about 70.000 pieces.

The Museum used 86 of mobile cultural assets in the five temporary exhibitions of 2013 (Annex1).

We hope that we were able to offer the visitors and participants in cultural activities undertaken by the Museum the opportunity to develop personally, to relax, to have fun, to conduct special activities different from the day-to-day ones.

We have also successfully achieved the objective of the museum which was to attract new audience by creating the temporary exhibition "The world of plants in cosmetics" in collaboration with the University of Medicine and Pharmacy of Târgu-Mureş.

Keywords: temporay exhibitions, museum's patrimony

Introduction

The exhibition is the most important way to enhance the museum heritage while at the same time representing the main form of cultural-educational manifestation of the museum, characteristic to this institution. The museum exhibition is a form of rendering complex and specialized information, using as a means of communication the ordered display of objects and images [2].

The department of Natural Sciences within Mureş County Museum holds valuable collections of fossils, minerals, rocks, plants, fungi, invertebrates (snails, clams and insects), birds, eggs, mammals and hunting trophies, totaling about 70.000 pieces.

Some of the pieces that make up the scientific collections are on display in the main exhibition of the museum, another part is displayed in temporary exhibitions on various topics, organized every year and most are preserved in the museum's scientific storages, constituting a real biodocumentaries archive.

The material of the storage is composed of two types of pieces:

– pieces that can be displayed in exhibitions organized by the museum;

– pieces that cannot expose several reasons: either they are too small or are only interesting for a small number of connoisseurs in natural sciences.

Materials and methods

The department of Natural Sciences of the County Museum held, at its premises at no. 24, Horia Street, and at the University of Medicine and Pharmacy from Târgu-Mureș, five thematic and collection temporary exhibitions on various cultural events included in the Plan of Activities of the Museum for 2013.

All these exhibits were entered into the cycle of capitalization of the rich and precious exhibition heritage of the Museum.

The temporary exhibitions cycle started on February 21, 2013, when for the International Mother Language Day the collection miniexhibition “*Macrophyte Algae from the Romanian Black Sea Coast and Beyond ...*” was organized.

Since 2011, the Department of Natural Sciences of the County Museum has been marked this day by organizing a temporary miniexhibition and a round table dedicated to the specificity of the material exposed. The stars are mobile cultural assets of the museum heritage belonging to Romanian, Hungarian and German collectors.

The activities are aimed at the school aged public, permissive and without preconceptions. The initiative for the museum activities to mark this event was based on the following findings:

- the local community is ethnically and culturally diverse;
- the department has collections illustrating this diversity;
- a diverse museum heritage must address a diverse community.

The objectives of the museum by marking this event are: promoting multiculturalism, highlighting the common elements that give the specificity of the community and the sharing of values, forming a civic and intellectual of collaborative behavior, exploiting the museum's collections, attracting a large number of visitors from different ethnicities.

The stars of the mini exhibition in 2013 were three genuine exhibits, which are three exotic algae, selected from the macrophytic algae collection “Daciana Sava” acquired by the museum in 2007.

The pedagogical component of the Museum, related to the miniexhibition, consisted of a round table, accompanied by a videoprojection in which curiosities from the world of algae exposed were presented, in German as well (Fig. 3).

The editorial component consisted in making a banner, invitations, posters popularising the event and some bookmarks – souvenir, with prints of these algae (Fig. 1, Fig. 2).

The event was attended by 53 people, 51 Romanian and German students and 2 adults, from National College “Unirea” from Târgu-Mureș and Secondary School “Friedrich Schiller” from Târgu-Mureș.

Then, on March 5, 2013, a temporary exhibition themed “*Pairs in the Wild*” was opened. The purpose of the exhibition was to valorify the creatures in pairs (male and female) of the museum's collections.

The exhibition brought to public attention from Mureș 66 authentic exhibits some together with auxiliary exhibits (photos, where there was no pair or where we wanted to illustrate the various situations of life of the exposed animals: fighting between males, pair formation and courtship rituals and mating), representing 62 pairs living creatures in the animal kingdom and plants: 18 pairs of insects (among which 12 pairs of exotic butterflies stood out), 8 species of exotic mollusks, 14 pairs of birds (including the emu, the national bird of Australia), 2 pairs of

mammals and 20 species of plants, the latter presented as auxiliary exhibits – posters. The plants presentation in the form of posters was chosen because it seemed more suggestive as a theme, more attractive to the public and more suitable for the museum's pedagogical activities.

Since our department currently has no specialists in zoology, we turned to the support of external collaborators, friends of the museum: Mrs. Florentina Togănel, researcher, Head of Department at the Department of Natural Sciences at the Mureş County Museum, retired, who answered to our request to assist us with outstanding scientific expertise in the field of entomology then, Museum of Oltenia, represented by Dr. Mirela Ridiche, expert in ornithology and Dr. Olivia Cioboiu, expert in malacology, who referenced scientific information on the birds and mollusks exposed.

We also enjoyed remarkable involvement of specialists from “Animal World” in Târgu-Mureş, who displayed some pairs of living animals in the exhibition, turning the opening into a real show. We thank, in this way, Mr. Corneliu – Dorin Oltean, engineer, administrator at SC Dorpex Impex SRL, Tîrgu-Mureş and “Animal World” (Fig. 5).

The editorial component consisted in making a banner, invitations, posters to popularise the event and explanatory leaflets (Fig. 4).

The exhibition was open to the large public.

The exhibition was visited by over 8000 people by the end of 2013.

Then, for the Museum Night on May 18, 2013, a temporary collection exhibition “*From the World of Mushrooms*” was opened in collaboration with the Society of Mycology “Málnássy László” from Târgu-Mureş. The objectives of the Museum were capitalizing macromycetes exhibition of museum collections, supplementing the exhibition base of the Department of Natural Sciences with new scientific information; highlighting the assets of the museum's heritage and the results of studies in the field; attracting public's attention to the need to protect the creatures, and the therapeutic effects of mushrooms; encouraging the consumption of fresh mushrooms from the wild, provided that they be checked by authorized inspectors, and familiarising the public with information on macromycetes.

Ten authentic exhibits were brought to public attention, 10 species of macromycetes purchased from the “Málnássy László” Society of Mycology from Târgu-Mureş, some with therapeutic properties, others beautifully and diversely colored (to illustrate the variability of color in the world of fungi), and about 50 auxiliary exhibits, i.e. 50 artistic photos of macromycetes made in nature by members of the “Málnássy László” Society of Mycology from Tîrgu-Mureş, and by various contributors. We point out that some of these photographs were awarded in different competitions of mycology. Likewise, it was displayed bibliographic material regarding the macromycetes.

We organized three exhibition related events at the opening: an exhibition of fresh mushrooms (prepared by members of “Málnássy László” Society of Mycology from Târgu-Mureş) (Fig. 8 a, b); an interactive corner where the visitors have been presented several ways to recognize edible and poisonous mushroom species and several ways of producing sporograms and a gourmet corner, where some food prepared from mushrooms could be tasted, prepared by members of the “Málnássy László” Society of Mycology from Târgu-Mureş.

The editorial component consisted in making a banner, invitations, posters to popularise the event and explanatory leaflets, in which recognition signs and symptoms of *Amanita phalloides* mushroom poisoning were presented (Fig. 6, 7).

The exhibition was attended by about 2000 people in a single day.

Then, on June 5, 2013, a temporary exhibition themed “*The Plant World in the field of Cosmetics*” was opened in collaboration with the University of Medicine and Pharmacy of

Târgu-Mureș. The exhibition was dedicated to the Symposium “65 years from the creation of the Botanical Garden of the University of Medicine and Pharmacy of Târgu-Mureș.” It was intended to bring public attention to some plant species from the museum’s collections used in modern cosmetics, but also in the traditional one, as well as some natural products used in cosmetics (Fig. 9).

Thus, from 5 to 8 of June 2013, at the University of Medicine and Pharmacy of Târgu-Mureș, on the corridors of Faculty of Dental Medicine, throughout the period of the symposium mobile cultural heritage of the department was presented to the public (medicinal plants containing active principles used in cosmetics, fruit molds made by conservation and restoration section; species of seeds and dried herbs fruits).

The exhibition was attended by about 1000 people, mainly university public: prestigious professors from institutions of higher education in Romania, specialists from the Botanical Gardens in Romania, students, etc., thus fulfilling one of the objectives of the museum in 2013, that of attracting new public. The sponsors of the event were S.C. Cosmetic Plant S.A.; S.C. Hofigal Export Import S.A.; S.C. Farmec S.A., who provided cosmetic products in which these medicinal plants can be found.

Then, in the honor of the National Day of Romania, *the museum matinee “Romanian Flag in the Natural World,”* was organized in cooperation with the National College “Alexandru Papiu Ilarian” of Târgu-Mureș, secondary school “George Coșbuc” of Târgu-Mureș and secondary school “Mihai Viteazul” of Târgu-Mureș, a theme miniexhibition entitled “Flag Representatives in the Natural World” whose stars were four birds protected by law, having Romanian tricolor plumage colours, presented as authentic exhibits (Fig. 11 a, b).

The cultural activities organized by the museum and at the museum, on the National Day of Romania, are intended to be homage to ancestors who have made possible our presence at the great feast of the Romanian nation.

The museum pedagogical component, related to the miniexhibition consisted of a projection in which curiosities about the birds on display were presented and also a workshop on museum pedagogy /creativity, where students recreated the exposed birds from puzzle pieces (Fig. 12 a, b).

Also, a student from National College “Alexandru Papiu Ilarian” of Târgu-Mureș made a power point presentation which concerns the Union of Bessarabia with Motherland Romania.

The editorial component consisted in making a banner, invitations and posters to popularise the event (Fig. 10).

In conclusion, the Department of Natural Sciences used 86 of mobile cultural assets in the five temporary exhibitions of 2013 (Annex1).

Valuing the educational potential of these assets has been successfully accomplished by organizing related activities to these temporary exhibitions, primarily in museum pedagogy. These activities gave the visitors true “cultural” joys as the large number of positive reviews in Book of impressions of the Museum and the verbal appreciations stand to prove it.

Conclusions

We hope we have managed to convert ourselves into a school complementary educational environment, that we became a sort of annex to the school, an out-desk learning space, given that predominantly children and students have crossed out threshold.

We also hope that we were able to offer the visitors and participants in cultural activities undertaken by the Museum the opportunity to develop personally, to relax, to have fun, to

conduct special activities different from the day-to-day ones; we hope to have managed to meet with visitors expectations to find another kind of museum.

We have also successfully achieved the objective of the museum which was to attract new audience by creating the temporary exhibition “The world of plants in cosmetics” in collaboration with the University of Medicine and Pharmacy of Târgu-Mureş.

It is worth pointing out that these activities have received 19 mentions in newspapers, periodicals, TV- Radio (1740 views), given that not all media sources have been exhausted, the full number of accesses or views. We decided to give the image of those that can be found on the Internet (Annex 2).

Annex 1: Cultural mobile assets valued through temporary exhibitions by the Natural Sciences Division of Mureș County Museum in 2013

No.	Cultural mobile asset	Inventory no.	Inventory register	Collection	The exhibition in which it has been valorified	Preservation method	Collection place
1	<i>Cystoseira barbata</i>	1087	Inferior plants	„Daciana Sava” macrophyte algae collection	„Macrophyte Algae from the Romanian Black Sea Coast and Beyond ...”	pressing and drying	The Black Sea, Constanța, România
2	<i>Padina pavonia</i>	1088	Inferior plants	„Daciana Sava” macrophyte algae collection	„Macrophyte Algae from the Romanian Black Sea Coast and Beyond ...”	pressing and drying	The Black Sea, Turkey
3	<i>Palmaria palmata</i>	1120	Inferior plants	„Daciana Sava” macrophyte algae collection	„Macrophyte Algae from the Romanian Black Sea Coast and Beyond ...”	pressing and drying	The Atlantic Ocean, France
4	<i>Charonia tritonis</i>	-	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
5	<i>Chicoreus ramosus</i> (<i>Murex ramosus</i>)	752	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	The Red Sea
6	<i>Cymbium glans</i>	799	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
7	<i>Haliotis</i> sp.	-	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
8	<i>Harpago chiragra</i> (<i>Lambis chiragra</i>)	595	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
9	<i>Mitra papalis</i>	886	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
10	<i>Pinna nobilis</i>	686	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	The Mediterranean Sea
11	<i>Tectus niloticus</i> (<i>Trochus niloticus</i>)	907	Malacology	„Sorin Puia” mollusks collection	Pairs in the wild	dried preservation	-
12	<i>Actias selene</i> (male)	253	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mummification)	Taiwan
13	<i>Actias selene</i> (female)	254	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mummification)	Taiwan
14	<i>Antheraea yamamai</i> (male)	248	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mummification)	Japan
15	<i>Antheraea yamamai</i> (female)	249	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mummification)	Japan

16	<i>Argema mittrei</i> (female)	241	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Madagascar
17	<i>Argema mittrei</i> (male)	242	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Madagascar
18	<i>Attacus atlas</i> (female)	270	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	India
19	<i>Automeris io</i> (female)	262	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Texas, U.S.A.
20	<i>Automeris io</i> (male)	263	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Texas, U.S.A.
21	<i>Charaxes tiridates</i> (male)	446	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Central Africa
22	<i>Euploea mulciber</i> (male)	316	Insects	Insects collection “Vasile Vicol”	Pairs in the wild	drying (mumifi- cation)	India
23	<i>Euploea mulciber</i> (female)	110	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	India
24	<i>Ornithoptera pri- amus arruana</i> (male)	68	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Indonezia
25	<i>Ornithoptera pri- amus arruana</i> (female)	69	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	Indonezia
26	<i>Pachliopta aristolo- chia</i> (male)	56	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	India
27	<i>Pachliopta aristolo- chia</i> (female)	57	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	India
28	<i>Papilio bromius</i> (male)	357	Insects	Insects collection “Vasile Vicol”	Pairs in the wild	drying (mumifi- cation)	Guinea (Africa)
29	<i>Papilio bromius</i> (female)	365	Insects	Insects collection “Vasile Vicol”	Pairs in the wild	drying (mumifi- cation)	Guinea (Africa)
30	<i>Precis orithyia</i> (male)	201	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumifi- cation)	India

31	<i>Precis orithyia</i> (female)	324	Insects	Insects collection „Vicol”	Pairs in the wild	drying (mumification)	Madagascar
32	<i>Troides helena</i> (female)	59	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumification)	Malaysia
33	<i>Troides helena</i> (male)	58	Insects	Butterflies collection „Wilhelm Weber”	Pairs in the wild	drying (mumification)	Malaysia
34	<i>Eurycantha calcarata</i> (female)	4183	Insects	Insects collection „Béla Kiss”	Pairs in the wild	drying (mumification)	Papua – New Guinea
35	<i>Eurycantha calcarata</i> (male)	4183	Insects	Insects collection „Béla Kiss”	Pairs in the wild	drying (mumification)	Papua – New Guinea
36	<i>Lucanus cervus</i> (female)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Răstolița – Mureș County
37	<i>Lucanus cervus</i> (male)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Răstolița – Mureș County
38	<i>Mantis religiosa</i> (female)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	-
39	<i>Melolontha melolontha</i> (female and male, during mating)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Ceuaș – Mureș County
40	<i>Oryctes nasicornis</i> (female)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Târgu-Mureș – Mureș County
41	<i>Oryctes nasicornis</i> (male)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Târgu-Mureș - Mureș County
42	<i>Psophus stridulus</i> (female and male)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Meștera, Gurghiuului Mountains – Mureș County
43	<i>Psophus stridulus</i> (male)	-	Insects	Insects collection	Pairs in the wild	drying (mumification)	Meștera, Gurghiuului Mountains – Mureș County
44	<i>Anas crecca</i> (male)	496	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureș – Mureș County
45	<i>Anas crecca</i> (female)	498	Aves	Birds collection	Pairs in the wild	taxidermy	Cristești – Mureș County

46	<i>Anas penelope</i> (male)	490	Aves	Birds collection	Pairs in the wild	taxidermy	Nazna - Mureş County
47	<i>Anas penelope</i> (female)	491	Aves	Birds collection	Pairs in the wild	taxidermy	Iernut - Mureş County
48	<i>Anas platyrhynchos</i> (female)	485	Aves	Birds collection	Pairs in the wild	taxidermy	Cristeşti - Mureş County
49	<i>Anas platyrhynchos</i> (male)	486	Aves	Birds collection	Pairs in the wild	taxidermy	Fărgău - Mureş County
50	<i>Carduelis chloris</i> (male)	405	Aves	Birds collection	Pairs in the wild	taxidermy	Moreşti - Mureş County
51	<i>Carduelis chloris</i> (female)	648	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureş - Mureş County
52	<i>Cinclus cinclus</i> (male)	352	Aves	Birds collection	Pairs in the wild	taxidermy	Praid - Harghita County
53	<i>Cinclus cinclus</i> (female)	353	Aves	Birds collection	Pairs in the wild	taxidermy	Bistra-Mureşului - Mureş County
54	<i>Dromaius novae- hollandiae</i> (female)	660	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureş, Zoological Garden - Mureş County
55	<i>Passer montanus</i> (male)	642	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureş - Mureş County
56	<i>Passer montanus</i> (female)	644	Aves	Birds collection	Pairs in the wild	taxidermy	Cristeşti - Mureş County
57	<i>Phasianus colchicus</i> (male)	399	Aves	Birds collection	Pairs in the wild	taxidermy	Râciu - Mureş County
58	<i>Phasianus colchicus</i> (female)	534	Aves	Birds collection	Pairs in the wild	taxidermy	Râciu - Mureş County
59	<i>Philomachus pugnax</i> (male)	554	Aves	Birds collection	Pairs in the wild	taxidermy	Iernut - Mureş County
60	<i>Philomachus pugnax</i> (female)	556	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureş - Mureş County
61	<i>Pica pica</i> (male)	613	Aves	Birds collection	Pairs in the wild	taxidermy	Vidrasău - Mureş County
62	<i>Pica pica</i> (female)	614	Aves	Birds collection	Pairs in the wild	taxidermy	Săbed - Mureş County

63	<i>Regulus regulus</i> (male)	400	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureș, Cornești Forest - Mureș County
64	<i>Regulus regulus</i> (female)	401	Aves	Birds collection	Pairs in the wild	taxidermy	Târgu-Mureș, Cornești Forest- Mureș County
65	<i>Sturnus vulgaris</i> (male)	632	Aves	Birds collection	Pairs in the wild	taxidermy	Cristești - Mureș County
66	<i>Sturnus vulgaris</i> (female)	633	Aves	Birds collection	Pairs in the wild	taxidermy	Săbed - Mureș County
67	<i>Tetrao urogallus</i> (male)	444	Aves	Birds collection	Pairs in the wild	taxidermy	Bilbor – jud. Harghita
68	<i>Tetrao urogallus</i> (female)	532	Aves	Birds collection	Pairs in the wild	taxidermy	Răstolita, Călimani Mountains – Mureș County
69	<i>Tetrastes bonasia</i> (<i>Bonasa bonasia</i>) (male)	529	Aves	Birds collection	Pairs in the wild	taxidermy	Turia – Covasna County
70	<i>Tetrastes bonasia</i> (<i>Bonasa bonasia</i>) (female)	530	Aves	Birds collection	Pairs in the wild	taxidermy	Turia – Covasna County
71	<i>Capreolus capreolus</i> (head) (male)	315	Mammalia	Mammals collection	Pairs in the wild	taxidermy	Săbed – Mureș County
72	<i>Cervus elaphus</i>	-	-	-	Pairs in the wild	dried preservation	-
73	<i>Amanita phalloides</i>	1125	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Ghindari, “Csere” Forest – Mureș County
74	<i>Auricularia auricula-judae</i>	1136	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Târgu-Mureș - Mureș County
75	<i>Coprinus comatus</i>	1142	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Pănet – Mureș County
76	<i>Flammulina velutipes</i>	1132	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Târgu-Mureș - Mureș County
77	<i>Geastrum coronatum</i>	1179	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Ghindari, “Csere” Forest- Mureș County

78	<i>Laetiporus sulphureus</i>	1208	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Văleni - Mureş County
79	<i>Lentinula edodes</i>	1207	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Ernei - Mureş County
80	<i>Pleurotus ostreatus</i>	1131	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Târgu-Mureş - Mureş County
81	<i>Polyporus umbellatus</i>	1166	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Târgu-Mureş - „Csere” Forest - Mureş County
82	<i>Xylaria polymorpha</i>	1174	Inferior plants	„Málnásky László” macro-mycetes collection	From the world of mushrooms	dried preservation	Târgu-Mureş, Corneşti Plateau- Mureş County
83	<i>Cygnus cygnus</i>	482	Aves	Birds collection	Romanian Flag in the Natural World	taxidermy	Cipău, Mureş river - Mureş County
84	<i>Cygnus olor</i>	481	Aves	Birds collection	Romanian Flag in the Natural World	taxidermy	Tîrgu-Mureş, Zoological Garden- Mureş County
85	<i>Phalacrocorax carbo</i>	474	Aves	Birds collection	Romanian Flag in the Natural World	taxidermy	-
86	<i>Phalacrocorax pygmaeus</i>	473	Aves	Birds collection	Romanian Flag in the Natural World	taxidermy	6th of March/ Sălcioara – Tulcea County

Annex 2: Press file

The visibility of the temporary exhibitions of Natural Sciences Division of Mureş County Museum in 2013

General picture on the visibility within the community of activity *Maternal Language International Day*

No.	Newspaper/periodical/TV-Radio station	Views
1	http://cimec.wordpress.com/2013/02/19/trgu-mures-zuia-internationala-a-limbii-materne-la-muzeul-judetean CIMEC	?
2	targumureseanul.ro <i>Toate ştirile oraşului</i> http://www.targumureseanul.ro	668
3	(monthly cultural publication) – February 2013, year IV, no. 2 (35) http://www.litart.ro/fileadmin/template/pdf/litart_februarie_2013.pdf Lit Art	?
Total		668

General picture on the visibility within the community of temporary exhibition *Pairs in the Wild*

No.	Newspaper/periodical/TV-Radio station	Views
1	CIMEC http://cimec.wordpress.com/2013/03/04/targu-mures-expozitia-temporara-perechi-n-natura	?
2	 Zi de zi http://www.zi-de-zi.ro/%E2%80%9Eperechi-in-natura-expuse-la-muzeu/ http://www.zi-de-zi.ro/galerie-fotovideo-balul-animalelor-la-muzeul-de-stiinte-ale-naturii/#ad-image-0	70+80=150
3	 CityNews http://citynews.ro/eveniment/perechi-natura-la-targu-mures-1235503	132
4	 http://www.port.ro/perechi_in_natura/pls/w/event.event_page?i_event_id=230464&i_event_area_id=24	?
5	 http://www.ziare.com/tg-mures/articole/perechi-in-natura+muzeu+targu+mures	?
6	 http://www.stiri-azi.ro/ziare/articol/targu-mure--expo-ia-temporara-perechi-in-natura/sumar-articol/110706911	?
7	 Adevărul de seară http://adevarul.ro/locale/targu-mures/cupluri-plante-animale-prezentate-publicului-muzeul-Stiintele-naturii-1_5135a6b300f5182b85ce5451/index.html	?
Total		282

General picture on the visibility within the community of temporary exhibition *From the World of Mushrooms*

No.	Newspaper/periodical/TV-Radio station	Views
1	CIMEC http://cimec.wordpress.com/category/targu-mures	?
2	 http://www.tirgumureseanul.ro/detali-stire/lista/home/articol/expozitia-temporara-din-lumea-ciupercilor.html?tx_ttnews[calendarYear]=2013&tx_ttnews[calendarMonth]=6&cHash=fd6d60d7c7e70210b66649c4948da0bd	472

3	http://regiuneacentru.ro/2013/05/la-tirgu-mures-noapte-muzeelor-tine-trei-zile-programul-complet-aici/Noaptea Muzeelor	?
4	http://www.noapteamuzeelor.ro/2013/05/13/muzeul-judetean-mures-3	?
5	 http://www.classiccarclub.ro/index.php?p=articole&p_title=Noaptea%20Muzeelor%202013%20-%20Targu%20Mures&nid=46	318
6	Liviu Rebreanu http://liviurebreanutmures.blogspot.ro/2013/05/noaptea-muzeelor-2013.html	?
7	Antena 3 http://www.antena3.ro/life-show/cultura/noaptea-muzeelor-2013-vezi-programul-complet-al-evenimentului-214548.html	?
Total		790

General picture on the visibility within the community of the activity **Romanian Flag in the Natural World**

No.	Newspaper/periodical/TV-Radio station	Views
1	CIMEC http://cimec.wordpress.com/2013/11	?
2	Radio Mureş http://www.radiomures.ro/stiri/ziua_na_ionala_sarbatorita_astazi_de_cei_mici_la_muzeu.html	?
Total		?

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VALORIFICAREA PATRIMONIULUI MUZEAL PRIN EXPOZIȚII TEMPORARE LA SECȚIA DE ȘTIINȚELE NATURII DIN CADRUL MUZEULUI JUDEȚEAN MUREȘ, ÎN ANUL 2013 (Rezumat)

Secția de Științele Naturii din cadrul Muzeului Județean Mureș a organizat, la sediul său de pe strada Horea nr. 24, precum și la Universitatea de Medicină și Farmacie din Târgu-Mureș, în anul 2013, cinci expoziții temporare tematice și de colecție, cu ocazia diverselor evenimente culturale incluse în Planul de activități al Muzeului pentru anul 2013. Toate aceste expoziții s-au înscris în ciclul de valorificare expozițională a bogatului și prețiosului patrimoniu al Secției, totalizând circa 70.000 de piese.

Secția de Științele Naturii a valorificat prin cele cinci expoziții temporare, în anul 2013, 86 de bunuri culturale mobile.

De asemenea, sperăm că am reușit să oferim publicului vizitator și participant la activitățile culturale derulate de Muzeu, posibilitatea de a se dezvolta personal, de a se recrea, de a se distra, de a desfășura activități deosebite de cele cotidiene.

De asemenea, s-a îndeplinit cu succes și obiectivul muzeului de atragere a unor noi segmente de public, prin realizarea expoziției temporare „Lumea plantelor în cosmetică”, în colaborare cu Universitatea de Medicină și Farmacie din Târgu-Mureș.

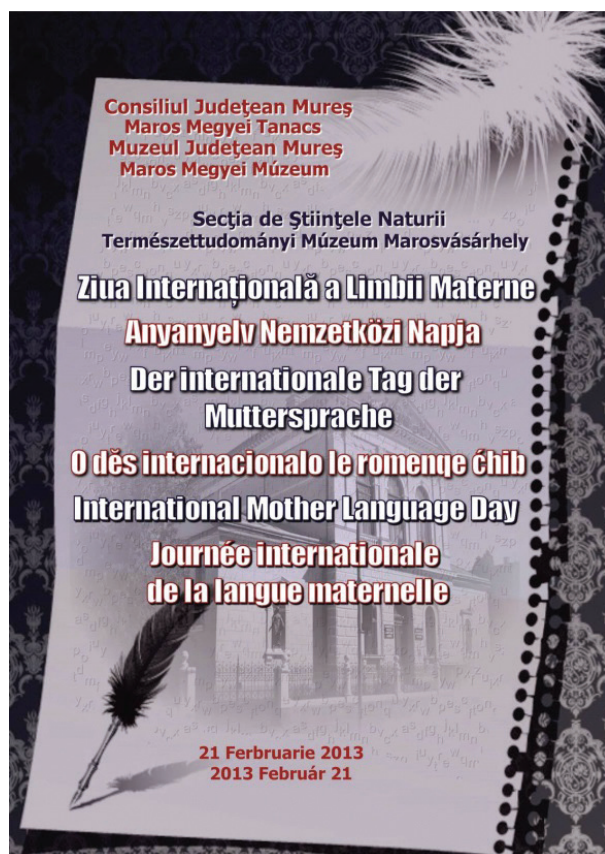


Fig. 1: The poster of the event (the International Mother Language Day)



Fig. 2: The bookmark – souvenir (the International Mother Language Day)



Fig. 3: The round table (the International Mother Language Day)



Fig. 4: The poster of the event (the exhibition “Pairs in the Wild”)



Fig. 5: The opening of the exhibition so called “Pairs in the Wild”



Fig. 6: The poster of the event (the exhibition "From the World of Mushrooms")

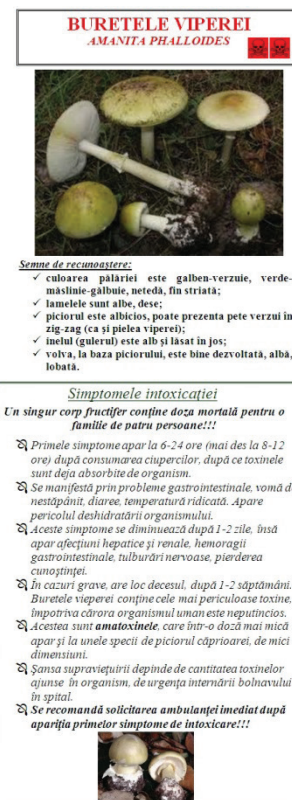
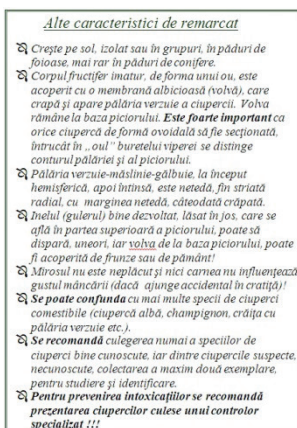


Fig. 7: The explanatory leaflets (the exhibition "From the World of Mushrooms")



Fig. 8 a: The exhibition of fresh mushrooms (the exhibition "From the World of Mushrooms")



Fig. 8 b: The opening of the exhibition so called "From the World of Mushrooms"



Fig. 9: The poster of the event (the exhibition “The Plant World in the field of Cosmetics”)



Fig. 10: The poster of the event (the museum matinee “Romanian Flag in the Natural World”)



Fig. 11 a: The miniexhibition “Flag Representatives in the Natural World”



Fig. 11 b: The miniexhibition “Flag Representatives in the Natural World”



**Fig. 12 a: The museum pedagogical component
("Flag Representatives in the Natural World")**



**Fig. 12 b: The museum pedagogical component
("Flag Representatives in the Natural World")**

THE CATALOG OF THE MAMMALS COLLECTION OF THE MUREȘ COUNTY MUSEUM, NATURAL SCIENCE DEPARTMENT

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Abstract: The Mureș County Museum collection of mammals was carried out from 1958 to 2014. For lack of a taxidermist first naturalized pieces were purchased. In 1967 the museum hired a taxidermist to continue preserving and compiling the collection. Most of the pieces arrived at the museum as animals accidentally shot or captured by a variety of individuals, such as Sárkány K. Andrew (curator), Kónya István (Head of Natural Science Department), the master hunter Szombath Stephen, and others. The museum's current collection has 36 naturalized pieces, 27 trophies, 296 animal skulls and two fur carpets, 16 skins, one head naturalized, a total of 378 mammal pieces, representing 32 species. The main exhibit includes 26 pieces naturalized, 16 skulls and the stark gold medalist trophy from Glodeni.

Keywords: mammals, study skins, mounted skins, skulls, trophies, carpet-fur, Mureș County Museum, Natural Science Department

Introduction

The patrimony of the Department of Natural Science at the Mureș County Museum includes many collections, whose scientific and documentary value is undisputed. The main goal of this paper is to present an inventory of mammals collection of the Natural Science Department. The Mureș County Museum Collection of mammals is composed of 378 pieces: skulls, trophies, skins, naturalized (mounted skins). Some of these pieces are displayed in the main exhibition either in the diorama or some thematic groups, small bio-groups such as: The trophic pyramid, The trophic network, Activity centre etc.

Material and methods

The systematic classification of mammals was made by Murariu, D., 2010 [4], Cuzic, M., Murariu, D., 2008 [1] and Lista mamiferelor din România [9].

The specified data are mentioned for each species: date and place of collection, the name of whom collected it, age and gender and the preparation technique. There are also mentioned the inventory numbers of the pieces included in inventory registry "Mammals" of the Department of Natural Sciences.

Results and discussions

The history of collection

The first pieces were purchased from the General Association of Hunters and Anglers (AGVPS) in Bucharest, before 1958 (by the curator Istvan Konya). At that time the Museum did not have a specialized taxidermist employee. After 1967, Museum hired a taxidermist (the author) who was entrusted to begin preserving and compiling the mammal collection. Once Mr. Szombath graduated from taxidermy classes, he began preparing small mammal study skins or naturalized specimens.

After expanding the Natural Science Department, several large pieces were naturalized using the dermoplasty method. These large pieces were displayed in the permanent exhibition which opened on February 16, 1988. Large animals (wolves, deer) were purchased from hunters, unprepared specimens, or have been received from the local zoo. Subsequently, the museum bought deer, chamois, wild boar trophies, and a bearskin with the head, prepared as a wall carpet. Trophies received as a donation do not achieve the requirements for medals, but they are evidence of hunting in different stages of development. Some of the trophies purchased won gold, silver or bronze medals at various national hunting exhibitions.

The main exhibition currently exhibits 26 naturalized mammals, 16 skulls and one deer trophy (*Cervus elaphus*). (Fig. 9, 5, 6, 8, 7, 10)

Several pieces were used during temporary exhibitions organized by the Natural Sciences Department in the main building of museum, at the "Fondul Plastic" Târgu-Mureş rooms and at The Medieval Fortress. Some of these displays were organized in collaboration with the Association of Hunters and Anglers and local hunters in town. The touring temporary exhibitions, in Reghin, Luduş and Târnăveni included some specimens from the mammals collection of the Museum.

In 1990 the deer trophy harvested by the engineer Brateanu Mihail at Glodeni, Mureş county, in the fall of 1989, was donated to museum from the Târgu-Mureş Forestry Inspectorate. In June 1995, the trophy was submitted to the national exhibition in Oradea. This same trophy was included to an international exhibition in Bucharest in 1997, where a gold medal was awarded.

The mammals collection species

1. *Ammotragus lervia*, 2 pieces naturalized
2. *Apodemus uralensis*, 1 piece study skin with skull
3. *Canis lupus*, 8 pieces (2 pieces naturalized 6 pieces skulls)
4. *Capreolus capreolus* (total 18), naturalized 4, trophy 13, naturalized head 1 piece
5. *Cervus elaphus* 1 piece trophy
6. *Clethrionomys glareolus* 3 pieces study skin with skull
7. *Cricetus cricetus*, 3 pieces naturalized 1 piece study skin, (total 4)
8. *Crocidura suaveolens*, 1 piece study skin with skull
9. *Erinaceus concolor*, 2 pieces naturalized
10. *Felis silvestris* total 3 pieces, (1 skin with skull, 1 skull, 1 carpet)
11. *Lepus europaeus*, 5 pieces (4 skulls, 1 naturalized)
12. *Lutra lutra*, 5 pieces skulls
13. *Martes martes*, 1 piece skull
14. *Meles meles*, 3 pieces (2 naturalized, 1 skin)
15. *Micromys minutus*, 1 piece skin

16. *Muscardinus avellanarius*, 1 piece naturalized
17. *Mustela erminea*, 1 piece skin
18. *Mustela nivalis*, 3 pieces naturalized
19. *Mustela putorius*, 3 pieces naturalized
20. *Myotis myotis*, 1 piece study skin
21. *Myoxus glis*, 3 pieces naturalized
22. *Ondatra zibethicus*, 48 pieces (2 naturalized, 46 skulls)
23. *Ovis ammon*, 1 piece naturalized
24. *Panthera leo*, 2 pieces skin and skull
25. *Rupicapra rupicapra*, 4 pieces trophy
26. *Sciurus vulgaris*, 1 piece naturalized
27. *Sorex araneus*, 2 pieces study skin with skull
28. *Spalax leucodon*, 1 piece skin
29. *Sus scrofa*, 14 pieces (4 skulls, 1 piece naturalized, 9 fangs)
30. *Talpa europaea* (?), 2 pieces naturalized
31. *Ursus arctos*, 2 pieces, (1 carpet, 1 skull, Fig.4)
32. *Vulpes vulpes*, 231 pieces, (3 naturalized, 228 skulls, 2 penis bone)

Of the five otter skulls, three were donated to the museum by Băcescu George from Murighiol (Tulcea county) at our suggestion. According to Mr. Băcescu several specimens of otter die annually in nets and pots. Eventhough many species of otters are protected, the total number of animals caught in the nets and pots is difficult to estimate, because these otters are not tolerated by anglers. The fourth specimen, probably shot and mortally wounded, was found dead in ponds in Iernut. The fifth item, a beautiful male was hit by a truck at Bălăușeri (Mureș County).

The local Zoo contributed to enrich the museum collection with 7 dead items: 1 piece of *Ovis ammon*, 2 pieces of *Ammotragus lervia* (Fig. 1), 2 pieces of *Capreolus capreolus* (Fig. 2) and a male and a female of *Panthera leo*. Five pieces were naturalized and the lion skins were preserved for later naturalization.

The two wolves bodies, naturalized and later displayed in the exhibition of the museum (Fig. 7, 10), were purchased from hunters. Two skulls were received as donation from hunters and four skulls originating from Șicasău, Harghita County, are coming from a former local gamekeeper, Mr. Szasz Andor.

Often, many small animals fall victim to car accidents on the roads. Very few of them reach the museum in a good shape for further naturalization or partial recovery (skull, skin). Among them, are the two copies of naturalized hedgehogs, the tree marten (*Martes martes*) skull, a ferret and a deer.

A group of individuals organized and promoted by Mr. Sárkány K. Andrei and helped by Szombath Ștefan – master hunter, wanted to enrich the museum collection as well as designing a scientific paper about the craniometry study of *Vulpes vulpes* species. As a result of their efforts the remains of 231 pieces of fox came to the museum through their collection actions

About 50 years ago, the appearance of muskrat on Mureș County was a novelty for local hunters. Over time, this invasive species settled on the wetland ecosystems in the county, causing a population explosion. As the muskrat population increased many hunters began to take interest in the muskrat for his fur. Because of the increased interest in muskrats, the Museum began collecting skulls by principal curator Sárkány K. Andrei (38 skulls, 1 skin), aided by Szombath Ștefan (8 skulls collected) and Godan Elena, who brought a dead animal that has been naturalized.

The origin of pieces

Mammals, donations (unprepared pieces – 254)

Inventory number

3	48	113	164	201	246	278	327
6	50	114	165	202	247	279	328
9	53	116	166	207	248	280	329
12	54	117	167	210	249	281	331
14	57	118	168	213	250	282	332
15	59	120	170	214	251	283	333
16	66	121	171	215	252	284	334
17	68	122	172	216	253	286	335
18	69	123	173	218	254	287	336
20	74	125	174	222	255	288	337
23	77	126	175	223	256	289	338
24	79	127	176	224	257	290	339
25	80	128	177	225	258	291	342
26	82	129	178	226	259	292	343
28	83	130	179	227	260	293	346
29	86	131	180	228	261	294	347
30	87	132	183	229	262	295	348
31	88	133	184	230	263	296	349
32	89	136	185	231	264	297	350
33	90	137	186	232	265	298	351
34	92	138	187	233	266	299	352
35	93	146	188	234	267	301	353
36	94	149	189	235	268	302	354
38	95	154	190	236	269	303	355
39	96	156	191	237	270	304	363
40	97	157	192	238	271	305	364
42	98	158	193	239	272	306	365
43	99	159	194	240	273	307	366
44	101	160	195	241	274	308	375
45	102	161	196	243	275	309	377
46	105	162	197	244	276	325	
47	106	163	200	245	277	326	

Prepared pieces donated to museum:

Inv. no. 149, *Ursus arctos* – skull

Inv. no. 210 *Myotis myotis*

Inv. no. 325 *Sus scrofa* fangs

Inv. no. 326 *Sus scrofa* fangs

Inv. no. 327 *Sus scrofa* fangs

Inv. no. 328 *Capreolus capreolus* – trophy

Inv. no. 329 *Rupicapra rupicapra* – trophy

Transferred pieces

Inv. no. 204 *Panthera leo*- male unskinned leather (Târgu-Mureş Zoo)

Inv. no. 211 *Cervus elaphus* – male trophy (Mureş Forestry Department)

Inv. no. 212 *Panthera leo* female unskinned leather (Târgu-Mureş Zoo)

Acquisitions (32 pieces)

Inv.no.	Species	Gender	Conservation type
100	<i>Capreolus capreolus</i>	female	skin
107	<i>Canis lupus</i>	male	skin
108	<i>Canis lupus</i>	female	skin
109	<i>Capreolus capreolus</i>	male	skin
110	<i>Sus scrofa</i>	female	naturalized
111	<i>Meles meles</i>	unknown	naturalized
112	<i>Meles meles</i>	unknown	naturalized
147	<i>Capreolus capreolus</i>	male	trophy
148	<i>Capreolus capreolus</i>	male	trophy
150	<i>Capreolus capreolus</i>	male	trophy
151	<i>Capreolus capreolus</i>	male	trophy
152	<i>Capreolus capreolus</i>	male	trophy
209	<i>Mustela putorius</i>	female	naturalized
285	<i>Ursus arctos</i>	unknown	cover
310	<i>Capreolus capreolus</i>	male	trophy
311	<i>Capreolus capreolus</i>	male	trophy
312	<i>Capreolus capreolus</i>	male	trophy
313	<i>Capreolus capreolus</i>	male	trophy
314	<i>Capreolus capreolus</i>	male	trophy
315	<i>Capreolus capreolus</i>	male	naturalized head
316	<i>Rupicapra rupicapra</i>	male	trophy
317	<i>Rupicapra rupicapra</i>	male	trophy
318	<i>Rupicapra rupicapra</i>	male	trophy
319	<i>Sus scrofa</i>	male	fangs
320	<i>Sus scrofa</i>	male	fangs
321	<i>Sus scrofa</i>	male	fangs
322	<i>Sus scrofa</i>	male	fangs
323	<i>Sus scrofa</i>	male	fangs
324	<i>Sus scrofa</i>	male	fangs
330	<i>Felis silvestris</i>	female	carpet
359	<i>Vulpes vulpes</i>	unknown	naturalized
360	<i>Lepus europaeus</i>	unknown	naturalized

Collected pieces

Mammals – pieces collected by museum's staff, 89 items

Inventory numbers

2	21	56	70	85	139	169	217	344	369
4	22	58	71	91	140	181	219	345	370
5	27	60	72	103	141	182	220	356	371
7	37	61	73	104	142	198	221	357	372
8	41	62	75	115	143	199	242	358	373
10	49	63	76	119	144	203	300	361	374
11	51	64	78	124	145	205	340	362	376
13	52	65	81	134	153	206	341	367	378
19	55	67	84	135	155	208	1	368	

Collecting places

1. Apalina (Reghin), MS, 2 pieces	56. Ercea, MS, 17 pieces
2. Band, MS, 1 pieces	57. Eremitu, MS, 2 pieces
3. Băla, MS, 4 pieces	58. Fărăgău, MS, 4 pieces
4. Bălăușeri, MS, 1 pieces	59. Fănațele Mădărașului, MS, 1 piece
5. Bistra Mureșului, MS, 1 piece	60. Fântânele, MS, 1 piece
6. Bozed, MS, 20 pieces	61. Filpișu Mic, MS, 1 piece
7. București, IF, 5 pieces	62. Gălățeni, MS, 1 piece
8. Budiu Mic, MS, 2 pieces	63. Gheorgheni, HR, 4 pieces
9. Câmpu Cetății, MS, 2 pieces	64. Giuluș (Ogra) MS, 1 piece
10. Cipău, MS, 1 piece	65. Glodeni, MS, 34 pieces
11. Cluj-Napoca, CJ, 1 piece	66. Gornești, MS, 1 piece
12. Cornești (Adămuș), MS, 5 pieces	67. Gudea (Stânceni), MS, 1 piece
13. Cornești, MS, 1 piece	68. Iernut, MS, 12 pieces
14. Corunca, MS, 1 piece	69. jud. MS, 3 pieces
15. Crăiești, MS, 20 pieces	70. Lechincioara, MS, 7 pieces
16. Culpiu, MS, 2 pieces	71. Lefaia, MS, 1 piece
17. Dâmbău (Adămuș), MS, 1 piece	72. Lunca Bradului (v.Ilvei) MS, 2 pieces
18. Dumbrăvioara, MS, 1 piece	73. Lunca Bradului, MS, 1 piece
19. Ercea, MS, 17 pieces	74. Mți.Făgăraș (va.Caprei) SB, 1 piece
20. Eremitu, MS, 2 pieces	75. Mți.Făgăraș (vf.Caprei) SB, 1 piece
21. Fărăgău, MS, 4 pieces	76. Mți.Făgăraș, SB, 1 piece
22. Fănațele Mădărașului, MS, 1 piece	77. Mți.Retezat (v.alea Morii) HD, 1 piece
23. Fântânele, MS, 1 piece	78. Murighiol, TL, 3 pieces
24. Filpișu Mic, MS, 1 piece	79. Nadeș, MS, 1 piece
25. Gălățeni, MS, 1 piece	80. Nima Râciului, MS, 8 pieces
26. Gheorgheni, HR, 4 pieces	81. Ogra, MS, 1 piece
27. Giuluș (Ogra) MS, 1 piece	82. Ozd, MS, 1 piece
28. Glodeni, MS, 34 pieces	83. Păcureni, MS, 1 piece
29. Gornești, MS, 1 piece	84. Păingeni, MS, 12 pieces
30. Gudea (Stânceni), MS, 1 piece	85. Pănet, MS, 1 piece
31. Iernut, MS, 12 pieces	86. Poarta, MS, 7 pieces
32. jud. MS, 3 pieces	87. Praid (Bucin), HR, 1 piece
33. Lechincioara, MS, 7 pieces	88. Răstolița, MS, 2 pieces
34. Lefaia, MS, 1 piece	89. Râciu, MS, 24 pieces
35. Lunca Bradului (v.Ilvei) MS, 2 pieces	90. Reghin, MS, 2 pieces
36. Lunca Bradului, MS, 1 piece	91. Rigmani, MS, 1 piece
37. Mți.Făgăraș (va.Caprei) SB, 1 piece	92. Săbed, MS, 25 pieces
38. Apalina (Reghin), MS, 2 pieces	93. Săcădat (v.Iszulyka) MS, 1 piece
39. Band, MS, 1 piece	94. Sânișor, MS, 2 pieces
40. Băla, MS, 4 pieces	95. Sânmărtinu de Câmpie, MS, 23 pieces
41. Bălăușeri, MS, 1 piece	96. Sânpaul, HR, 1 piece
42. Bistra Mureșului, MS, 1 piece	97. Sânsimion, HR, 1 piece
43. Bozed, MS, 20 pieces	98. Sântana de Mureș, MS, 5 pieces
44. București, IF, 5 pieces	99. Sovata, MS, 4 pieces
45. Budiu Mic, MS, 2 pieces	100. Suveica, MS, 2 pieces
46. Câmpu Cetății, MS, 2 pieces	101. Șicasău (Zetea), HR, 6 pieces
47. Cipău, MS, 1 piece	102. Șincai, MS, 5 pieces
48. Cluj-Napoca, CJ, 1 piece	103. Târgu-Mureș, MS, 22 pieces
49. Cornești (Adămuș), MS, 5 pieces	104. Toldal, MS, 39 pieces
50. Cornești, MS, 1 piece	105. Țigmandru (Nadeș) MS 1 piece
51. Corunca, MS, 1 piece	106. Urmeniș, MS, 1 piece
52. Crăiești, MS, 20 pieces	107. Vadu (Vărgata), MS, 1 piece
53. Culpiu, MS, 2 pieces	108. Viforoasa, MS, 1 piece
54. Dâmbău (Adămuș), MS, 1 piece	109. Voivodeni, MS, 3 pieces
55. Dumbrăvioara, MS, 1 piece	110. Zau de Câmpie, MS, 1 piece

The number of pieces listed by the counties where they were collected

MS (Mureș) = 352 pieces

HR (Harghita) = 13 pieces

SB (Sibiu) = 3 pieces

IF (Ilfov) = 5 pieces

TL (Tulcea) = 3 pieces

HD (Hunedoara) = 1 piece

CJ (Cluj) = 1 piece

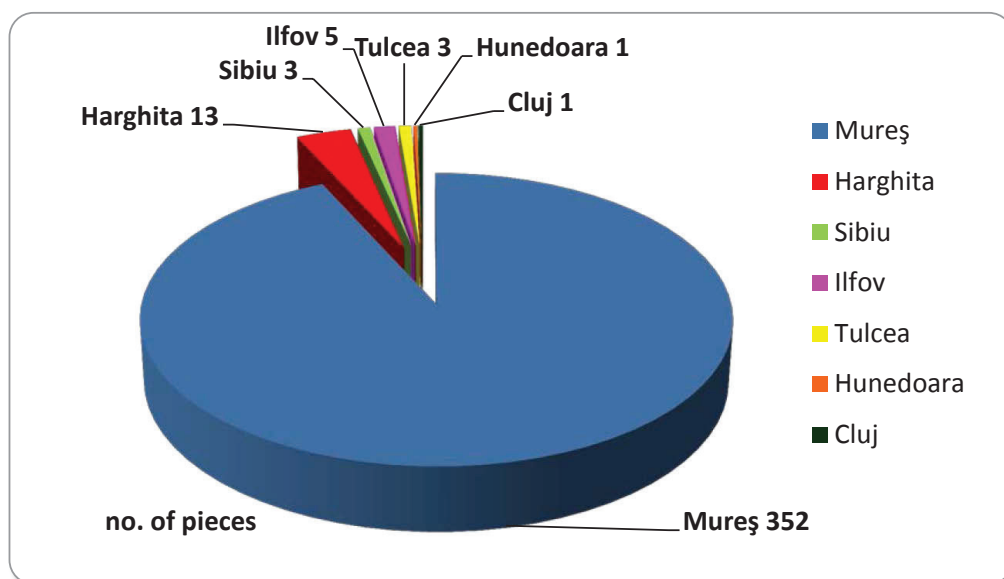


Fig. 1: Repartition of pieces by counties

Most of the pieces come from Mureș county (93%), and 7% from other counties. Most of the tracks were shot at Toldal (39), of which only one piece of deer, one hare and one piece of *Muscardinus avellanarius* (the Hazel Dormouse collected), and the remaining 36 copies are fox skulls brought by Sárkány K. Andrei. the rest of the pieces come from the following villages: Săbed (25 pieces), Râciu (24 pieces), Sânmartinu de Câmpie (23 pieces), Târgu-Mureș (22 pieces), Crăiești (20 pieces) and Bozed (20 pieces). This list shows that Sárkány K. Andrei and Szombath Ștefan were hunting in those areas.

Legit: 378 pieces

1. AGVPS București, inv. no.: 110, 111, 112, 359, 360
2. AGVPS Mureș, inv. no.: 149
3. Balogh Barna, inv. no.: 113
4. Băcescu Gheorghe, inv. no.: 363, 364, 366
5. Boros Gábor, inv. no.: 375
6. Ciobotă Sabin, inv. no.: 107
7. Cioloboc Ioan, inv. no.: 142, 243
8. Csomós Benedek, 138
9. Dr. Deak Alexandru, inv. no.: 310, 311, 312, 314, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, (tot. 17 pieces)
10. Deak Alexandru jun., inv. no.: 330
11. Deak Ecaterina, inv. no.: 313, 316
12. Godan Elena, inv. no.: 300, 340, 341, 374, 376
13. Hărșan Mircea, inv. no.: 47, 93, 239
14. Horváth Gyula, inv. no.: 114
15. Mureș Forest Department, inv. no.: 211
16. Iosif Ioan, inv. no.: 108

17. Kelemen Attila, inv. no.: 20
18. Kiss Zoltán, inv. no.: 196
19. Kohl Ștefan, inv. no.: 197, 209, 210
20. Kónya István, inv. no.: 38, 39, 42, 103, 104, 146
21. Lakatos Andrei, inv. no.: 285
22. Târgu-Mureș Forest Department, inv. no.: 244
23. Oroian Silvia, inv. no.: 344
24. Sárkány Kiss Andrei, inv. no.: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 17, 19, 21, 22, 23, 24, 25, 27, 28, 29, 31, 33, 35, 36, 37, 40, 41, 43, 49, 50, 51, 52, 53, 55, 56, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 70, 71, 72, 73, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 88, 89, 90, 91, 92, 115, 116, 119, 124, 125, 126, 127, 128, 129, 130, 131, 133, 134, 135, 136, 137, 139, 140, 141, 145, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 198, 199, 203, 205, 206, 207, 208, 218, 220, 221, 250, 333, 345, 357, 358, 378, (total 148 pieces)
25. Smidt, inv. no.: 99
26. Szabó József jun, inv. no.: 365
27. Szabó-Mátis-Ruprecht, inv. no.: 343
28. Szántó András, inv. no.: 101
29. Szász Andor, inv. no.: 245
30. Szombath Ștefan, inv. no.: 15, 16, 18, 26, 30, 32, 34, 44, 45, 46, 48, 54, 57, 69, 74, 87, 102, 117, 118, 120, 121, 122, 123, 132, 147, 150, 151, 178, 179, 200, 201, 202, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 246, 247, 248, 249, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 301, 302, 303, 304, 305, 306, 307, 308, 309, 315, 331, 332, 334, 335, 336, 337, 338, 339, 342, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, (tot 133 pieces)
31. Szombath Zoltán, 143, 144, 213, 214, 215, 216, 217, 219, 222, 242, 356, 361, 362, 367, 368, 369, 370, 371, 372, 373, (total 20 pieces)
32. Tatár Lázár, inv. no.: 100, 109
33. Vajda Zoltán, inv. no.: 105, 106
34. XY, inv. no.: 148, 152
35. Zoo, Târgu-Mureș, inv. no.: 94, 95, 96, 97, 98, 204, 212.

It should be noted that donors on this list are the ones who brought or sent pieces to the museum. In some cases, these specimens were seized from them. In the case of Sárkány Andrei and Szombath Ștefan was different, because their specimens were collected also from the recovery of fox and muskrat skulls that were captured by hunters who found the items left in the places where they were hunting. Because of their efforts, the collection of the museum bones has been effectively enriched (A. Sárkány providing 39.15% and Ștefan Szombath imparting 35.18% of the pieces). The names of those who have shot the specimens (recovered by these two) are mentioned in the full inventory of the museum's collection and the attached list.

List of the hunters who shot the pieces from museum's collection

1. Ács János jun., 2 pieces	32. Nagy József, 1 piece
2. Ács László, 1 piece	33. Nagy Kálmán, 1 piece
3. Agh József, 1 piece	34. Nagy László, 4 pieces
4. Aszalos Albert, 2 pieces	35. Neaguly A., 2 pieces
5. Bartha Albert, 1 piece	36. Păcurar Ion, 3 pieces
6. Bartha Albert, 1 piece	37. Rácz Ferenc, 11 pieces
7. Berecki Boldizsár, 1 piece	38. Rezi Ferenc, 1 piece
8. Berekméri András, 1 piece	39. Ruja Ioan, 3 pieces
9. Bodor Vilmos, 10 pieces	40. Ruja János, 2 pieces
10. Bokor Dominic, 4 pieces	41. Sárkány Attila, 1 piece
11. Brăteanu Mihai, 1 piece	42. Saszett Dezső, 8 pieces
12. Carabiber Cătălin, 1 piece	43. Soós Iosif, 4 pieces
13. David Ovidiu, 3 pieces	44. Stejăran Iosif, 1 piece
14. Farcádi Domokos, 1 piece	45. Szabó Béla, 1 piece
15. Fărăgău V., 1 piece	46. Szántó Árpád, 1 pieces
16. Fülöp Lajos, 1 pieces	47. Szász Andor, 6 pieces
17. Găzdac Ovidiu, 9 pieces	48. Szikszai László, 4 pieces
18. Gorea Horațiu, 1 piece	49. Szilágyi János, 1 piece
19. Ilyés Sándor, 1 piece	50. Szilágyi József, 2 pieces
20. Jakab Alpiecesandru, 2 pieces	51. Szkridon Márton, 1 piece
21. Jakab Sándor, 2 pieces	52. Tárca Vince, 1 piece
22. Kertész Endre, 4 pieces	53. Tóth Dénes, 1 piece
23. Kiss Péter, 7 pieces	54. Turcu Ștefan, 2 pieces
24. Kiss Zoltán, 13 pieces	55. Vajda Ferenc, 1 piece
25. Kovács József, 2 pieces	56. Varga Mihály, 2 pieces
26. Kulcsár László, 4 pieces	57. Venczel József, 7 pieces
27. Luca Liviu, 1 piece	58. Venczel Zsigmond, 6 pieces
28. Marian Sabin, 5 pieces	59. Voniga Ștefan, 2 pieces
29. Mănișor Augustin, 4 pieces	60. Ziliștean Radu, 3 pieces
30. Mănișor Horațiu, 3 pieces	61. Zolyomi György, 1 piece
31. Molnár Sándor, 13 pieces	

The list of who prepared the mammals (skulls, trophies, study skins, mounted skins):

No. crt.	Prepared by	No. of pieces
1.	AGVPS București	5
2.	AGVPS Mureș	1
3.	Deak Alexandru dr.	19
4.	Deak Alexandru jun	1
5.	Inspectorat Silvic Mureș	1
6.	Kohl Ștefan	4
7.	Kónya István jun.	16
8.	Sárkány Kiss Andrei	10
9.	Szabó József	1
10.	Szombath Ștefan	5
11.	Szombath Zoltán	312
12.	XY (unknown)	3
	Total	378 pieces

The composition of the collection, storage form

- study skins: 9 pieces
- mounted skins (in storages or displayed in exhibition): 36 pieces

- naturalized head: 1 piece
- wild boar fangs: 9 pieces
- trophies (13 fallow deers, 4 chamois, 1 common deer): 18 pieces
- wall carpet: 2 pieces
- skins: 4 pieces
- skin with skull: 3 pieces
- skulls (in storages and displayed): 296 pieces plus 2 penis bones

The health of any collection is dependent on the proper microclimate for a stored collection as well as the pieces displayed in an exhibition. Ensuring an optimal climate is the continuing duty of conservators, the “guardians” of cultural artifacts. The Spaces of Natural Science Department takes numerous steps to ensure an advantageous climate for their mammal collections, these procedures include:

- Disinfecting the appropriate museum spaces 4 times annually.
- Preventing vulnerable collection decline by using different insecticides when necessary.
 - Temporary exhibitions
 - Displayed pieces
 - Stored items.
- Cleaning yearly pieces displayed in the main exhibit.
- Sanitizing the pieces in the main exhibit every time it is improved by changing items.
- Controlling the humidity at the optimal level using dehumidification equipment.

As with any museum and exhibit, the flow of visitors is a desirable thing. We want people to enjoy and appreciate the Museum’s collections, but introducing people into the display areas has a few added risks for keeping a safe microclimate. These risks can include introducing additional unwanted pests and disturbing the already fragile microclimate. Because of these risks the Spaces of Natural Science Department must have constant vigilance with an eye towards conservation. By being vigilant, the conservators guarantee the best possible environment for the healthy, vibrant biological collection.

Systematic check-list of mammal collection

ORDER INSECTIVORA

Family Erinaceidae

Erinaceus concolor, Martin, 1838

Nr. Inv.	Species	Age	Collecting place	Date	Type of preparation
104	?	juv.	Târgu-Mureș, MS	11.10.1979	naturalized
356	♂	adult	Târgu-Mureș, MS	17.04.1985	naturalized

Family Soricidae

Sorpieces araneus Linnaeus, 1758

370	?	adult	Târgu-Mureș, MS	07.01.1978	study skin with skull
371	?	adult	Târgu-Mureș, MS	08.01.1978	study skin with skull

Crocidura suaveolens Pallas, 1811

372	?	adult	Târgu-Mureș, MS	16.01.1978	study skin with skull
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Family Talpidae

Talpa europaea Linnaeus, 1758

114	♀	adult	Târgu-Mureș, MS	27.03.1982	naturalized
115	♂	adult	Zau de Câmpie, MS	28.04.1983	naturalized

ORDER CHIROPTERA

Family Vespertilionidae

Myotis myotis Borkhausen, 1797

210	♀	adult	Reghin, MS	04.07.1987	study skin
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ORDER LAGOMORPHA

Family Leporidae

Lepus europaeus Pallas, 1778

205	♂	adult	Glodeni, MS	04.12.1988	skull
206	♂	adult	Ercea, MS	09.12.1988	skull
342	♂	adult	Săbed, MS	11.01.2002	skull
345	♀	adult	Toldal, MS	25.12.1988	skull
360	?	adult	București, IF	1955–1957	naturalized

ORDER RODENTIA

Family Sciuridae

Sciurus vulgaris Linnaeus, 1758

361	♀	adult	Praid (Bucin), HR	28.09.1969	naturalized
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Family Cricetidae

Cricetus cricetus Linnaeus, 1758,

145	♂	adult	Glodeni, MS	30.03.1981	naturalized
341	♂	juv.	Sântana de Mureș, MS	17.10.2002	naturalized
362	♂	adult	Viforoasa, MS	02.05.1989	naturalized
374	?	adult	Sântana de Mureș, MS	10.09.1990	study skin

Clethrionomys glareolus Schreber, 1780

367	?	adult	Târgu-Mureș, MS	26.06.1970	study skin with skull
368	?	adult	Târgu-Mureș, MS	24.06.1970	study skin with skull
369	?	adult	Târgu-Mureș, MS	27.06.1970	study skin with skull

Ondatra zibethicus Linnaeus, 1766, (tot. 48 pieces: 2 nat., 46 skulls, Fig. 2)

55	♀	adult	Iernut, MS	11.04.1980	skull
56	?	adult	Fărăgău, MS	10.03.1981	skull
57	♂	adult	Șincai, MS	06.04.1983	skull
58	♂	adult	Iernut, MS	28.03.1980	skull
59	♀	adult	Glodeni, MS	26.10.1981	skull
60	♂	adult	Glodeni, MS	10.03.1981	skull
61	♂	adult	Iernut, MS	03.04.1980	skull
62	♀	adult	Băla, MS	18.03.1982	skull
63	?	adult	Păingenii, MS	23.03.1982	skull
64	♀	adult	Poarta, MS	29.03.1982	skull
65	♂	adult	Iernut, MS	15.04.1980	skull
66	♂	adult	Poarta, MS	29.03.1982	skull
67	♂	adult	Fărăgău, MS	10.04.1981	skull
68	♂	adult	Târgu-Mureș, MS	23.03.1983	skull
69	♂	adult	Șincai, MS	09.04.1983	skull
70	♀	adult	Fărăgău, MS	11.03.1982	skull
71	♀	adult	Iernut, MS	29.03.1980	skull
72	♂	adult	Cipău, MS	11.04.1980	skull
73	♀	adult	Glodeni, MS	30.03.1981	skull
74	♂	adult	Șincai, MS	06.04.1983	skull
75	♂	adult	Iernut, MS	29.03.1980	skull
76	♀	adult	Gornești, MS	14.04.1980	skull
77	♂	adult	Apalina (Reghin), MS	08.04.1983	skull
78	♂	adult	Glodeni, MS	02.03.1981	skull
79	♀	adult	Voivodeni, MS	16.03.1983	skull
80	♂	adult	Ogra, MS	01.03.1983	skull
81	♂	adult	Dumbrăvioara, MS	06.04.1983	skull
82	♀	adult	Târgu-Mureș, MS	23.03.1983	skull
83	♂	adult	Apalina (Reghin), MS	08.04.1983	skull
84	♂	adult	Lechincioara, MS	06.04.1983	skull
85	♂	adult	Glodeni, MS	21.03.1983	skull
86	♀	adult	Glodeni, MS	24.03.1983	skull
87	♀	adult	Lechincioara, MS	10.04.1983	skull
88	♀	adult	Glodeni, MS	21.03.1983	skull

89	♂	adult	Fărăgău, MS	30.03.1983	skull
90	♂	adult	Glodeni, MS	21.03.1983	skull
91	♂	adult	Iernut, MS	11.04.1980	skull
92	♂	adult	Glodeni, MS	21.03.1983	skull
155	?	juv.	Iernut, MS	13.11.1985	skull
198	♂	adult	Păingenii, MS	03.04.1984	skull
199	♂	adult	Păingenii, MS	03.04.1984	skull
200	♀	adult	Lechincioara, MS	31.03.1984	skull
201	♀	adult	Lechincioara, MS	01.04.1984	skull
202	♂	adult	Lechincioara, MS	24.03.1984	skull
203	♂	adult	Păingenii, MS	11.04.1984	skull
242	♀	adult	Păcureni, MS	05.02.1994	skull
358	♂	adult	Iernut, MS	13.03.1980	naturalized
376	♀	adult	Sântana de Mureș, MS	15.02.1993	naturalized

Family Spalacidae

Spalax leucodon Nordmann, 1840

343	?	adult	Cluj-Napoca, CJ	03.06.2001	skin
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Family Muridae

Apodemus uralensis (Pallas, 1811)

373	?	adult	Târgu-Mureș, MS	28.01.1978	study skin with skull
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Micromys minutus Pallas, 1771

144	♂	adult	Iernut, MS	12.11.1988	skin
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Family Gliridae

Myoxus glis Linnaeus, 1766

105	♀	subadult	Lunca Bradului (v.Ilvei) MS	26.07.1982	Naturalized (Fig. 8)
106	♂	adult	Lunca Bradului (v.Ilvei) MS	26.07.1982	naturalized
344	♀	adult	Răstolița, Ms	02.12.2000	naturalized

Muscardinus avellanarius Linnaeus, 1758

357	?	adult	Toldal, MS	27.04.1985	naturalized
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ORDER CARNIVORA

Family Mustelidae

Mustela erminea Linnaeus, 1758

102	♂	adult	Săbed, MS	26.11.1979	skin
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Mustela nivalis Linnaeus, 1766, 3

101	♂	adult	Band, MS	26.03.1978	naturalized
103	♂	adult	Sânișor, MS	19.11.1981	naturalized
113	?	adult	Târgu-Mureș, MS	07.1970	naturalized

Mustela putorius Linnaeus, 1758

209	♀	adult	Reghin, MS	14.09.1955	naturalized
300	♂	juv.	Sântana de Mureș, MS	21.07.1991	naturalized
340	♂	adult	Sântana de Mureș, MS	12.11.2000	naturalized

Martes martes Linnaeus, 1758

245	♂	adult	Șicasău (Zetea), HR	02.12.1989	skull
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Meles meles Linnaeus, 1758,

111	?	adult	București, IF	(before) 1959	naturalized
112	?	adult	București, IF	(before) 1960	naturalized
143	?	juv.	Sânpaul, HR	11.07.1988	skin

Lutra lutra, Linnaeus, 1758

217	?	juv.	Iernut, MS	08.10.1990	skull
363	♂	adult	Murighiol, TL	26.01.2009	skull
364	♂	adult	Murighiol, TL	09.02.2009	skull
365	♂	adult	Bălăușeri, MS	28.09.2009	skull
366	♂	adult	Murighiol, TL	03.2005	skull

Family Ursidae*Ursus arctos* Linnaeus, 1758

149	?	imm.	jud. MS	(before)1988	skull
285	?	adult	Sânsimion, HR	24.12.1990	carpet

Family Canidae*Canis lupus* Linnaeus, 1758

107	♂	adult	Gudea (Stânceni), MS	14.12.1982	naturalized
108	♀	adult	Dâmbău (Adămuș), MS	08.04.1983	naturalized
146	?	adult	Sovata, MS	12.1981	skull
196	♀	adult	Ercea, MS	14.12.1980	skull
213	♂	adult	Șicasău (Zetea), HR	08.12.1989	skull
214	♂	adult	Șicasău (Zetea), HR	08.12.1989	skull
215	♂	adult	Șicasău (Zetea), HR	20.01.1990	skull
216	♀	adult	Șicasău (Zetea), HR	15.02.1990	skull

Vulpes vulpes Linnaeus, 1758, (tot.231 piece, din care 3 nat. 228 skull, 2 os penis)

1	♂	adult	Voivodeni, MS	09.12.1979	penis bone, skull
2	♂	adult	Ercea, MS	22.02.1981	skull
3	♀	adult	Suveica, MS	22.02.1981	skull
4	♀	adult	Ercea, MS	19.02.1981	skull
5	♂	adult	Ercea, MS	11.02.1981	skull
6	♀	adult	Glodeni, MS	01.1980	skull
7	♂	adult	Ercea, MS	01.02.1981	skull
8	?	adult	Săbed, MS	12.1977	skull
9	♂	adult	Voivodeni, MS	09.12.1979	skull
10	♀	juv.	Glodeni, MS	25.11.1981	skull
11	♀	adult	Toldal, MS	15.03.1981	skull
12	♂	adult	Păingeni, MS	02.12.1979	skull
13	♂	adult	Toldal, MS	12.1980	skull
14	♀	adult	Filpișu Mic, MS	01.03.1981	skull
15	♂	adult	Urmeniș, MS	1980	skull
16	♂	adult	Săbed, MS	12.1979	skull
17	?	adult	Gheorgheni, HR	1979	skull
18	♂	adult	Săbed, MS	25.12.1976	skull
19	♀	juv.	Glodeni, MS	25.11.1981	skull
20	♂	adult	Eremitu, MS	11.1971	skull
21	♂	adult	Poarta, MS	02.1981	skull
22	♂	adult	Glodeni, MS	25.11.1981	skull
23	?	adult	Gheorgheni, HR	1979	skull
24	?	adult	Gheorgheni, HR	1979	skull
25	♂	adult	Toldal, MS	08.03.1981	skull
26	♂	adult	Sânămartinu de Câmpie, MS	25.12.1983	skull
27	♀	adult	Toldal, MS	02.12.1983	skull
28	♀	adult	Toldal, MS	02.12.1983	skull
29	♂	adult	Toldal, MS	16.12.1983	skull
30	♂	adult	Lechincioara, MS	07.12.1983	skull
31	♂	adult	Gheorgheni, HR	12.1982	skull
32	♂	adult	Râciu, MS	10.12.1983	skull
33	♀	adult	Poarta, MS	06.03.1983	skull
34	♀	adult	Râciu, MS	10.12.1983	skull
35	♀	adult	Toldal, MS	02.12.1983	skull

36	♀	adult	Cornești, MS	25.02.1983	skull
37	♂	adult	Toldal, MS	12.12.1982	skull
38	?	adult	Sovata, MS	12.1981	skull
39	?	adult	Sovata, MS	12.1981	skull
40	♂	adult	Glodeni, MS	21.02.1982	skull
41	?	adult	Iernut, MS	03.12.1982	skull
42	♂	adult	Sovata, MS	25.01.1982	skull
43	♂	adult	Toldal, MS	11.01.1984	penis bone, skull
44	♀	adult	Toldal, MS	11.01.1984	skull
45	♀	adult	Toldal, MS	11.01.1984	skull
46	♂	adult	Sânmărtinu de Câmpie, MS	25.12.1983	skull
47	♀	adult	Râciu, MS	10.12.1983	skull
48	♀	adult	Râciu, MS	08.01.1984	skull
49	♂	adult	Cornești (Adămuș), MS	18.01.1984	skull
50	♀	adult	Cornești (Adămuș), MS	18.01.1984	skull
51	♂	adult	Cornești (Adămuș), MS	18.01.1984	skull
52	♂	adult	Cornești (Adămuș), MS	18.01.1984	skull
53	♀	adult	Cornești (Adămuș), MS	18.01.1984	skull
54	♂	adult	Râciu, MS	22.12.1985	skull
99	♂	juvenile	jud. MS	12.07.1977	naturalized
116	♂	adult	Toldal, MS	19.02.1984	skull
117	♀	adult	Culpiu, MS	18.03.1984	skull
118	♂	adult	Râciu, MS	05.02.1984	skull
119	♀	adult	Toldal, MS	15.11.1984	skull
120	♂	adult	Nima Râciului, MS	23.12.1984	skull
121	♀	adult	Săbed, MS	26.11.1984	skull
122	♀	adult	Săbed, MS	24.12.1984	skull
123	?	adult	Săbed, MS	26.11.1984	skull
124	♂	adult	Ercea, MS	02.12.1984	skull
125	♂	adult	Ercea, MS	02.12.1984	skull
126	♂	adult	Ercea, MS	02.12.1984	skull
127	♂	adult	Ercea, MS	02.12.1984	skull
128	♂	adult	Glodeni, MS	02.01.1985	skull
129	♀	adult	Glodeni, MS	03.02.1985	skull
130	♂	adult	Toldal, MS	03.02.1985	skull
131	♂	adult	Toldal, MS	03.02.1985	skull

132	♂	adult	Lechincioara, MS	03.02.1985	skull
133	♂	adult	Glodeni, MS	05.03.1985	skull
134	♂	adult	Glodeni, MS	26.01.1985	skull
135	♂	adult	Glodeni, MS	03.03.1985	skull
136	♂	adult	Glodeni, MS	03.03.1985	skull
137	♂	adult	Glodeni, MS	03.03.1985	skull
138	♂	adult	Pănet, MS	23.01.1991	skull
139	♀	adult	Păingenii, MS	14.02.1988	skull
140	♂	adult	Păingenii, MS	14.02.1988	skull
141	♂	adult	Păingenii, MS	14.02.1988	skull
153	♂	adult	Glodeni, MS	02.02.1986	skull
154	♀	adult	Glodeni, MS	09.04.1986	skull
156	♂	adult	Toldal, MS	09.02.1986	skull
157	♀	adult	Băla, MS	01.12.1985	skull
158	♂	adult	Glodeni, MS	02.02.1986	skull
159	♀	adult	Toldal, MS	08.12.1985	skull
160	♂	adult	Păingenii, MS	12.01.1986	skull
161	♀	adult	Toldal, MS	09.04.1986	skull
162	♂	adult	Glodeni, MS	02.02.1986	skull
163	♀	adult	Glodeni, MS	03.01.1988	skull
164	♀	adult	Toldal, MS	10.11.1985	skull
165	♀	adult	Toldal, MS	17.11.1985	skull
166	♂	adult	Toldal, MS	09.02.1986	skull
167	♀	adult	Ercea, MS	01.12.1985	skull
168	♂	adult	Toldal, MS	10.11.1985	skull
169	♀	adult	Toldal, MS	10.11.1985	skull
170	♂	adult	Toldal, MS	08.12.1985	skull
171	♀	adult	Ercea, MS	01.12.1981	skull
172	♀	adult	Poarta, MS	01.12.1985	skull
173	♂	adult	Toldal, MS	10.11.1985	skull
174	♂	adult	Poarta, MS	01.12.1985	skull
175	♀	adult	Ercea, MS	01.12.1985	skull
176	♀	adult	Glodeni, MS	02.03.1986	skull
177	♂	adult	Toldal, MS	17.11.1985	skull
178	?	adult	Râciu, MS	10.11.1985	skull

179	♀	adult	Săbed, MS	10.11.1985	skull
180	♂	adult	Toldal, MS	09.04.1986	skull
181	♂	adult	Lefaia, MS	21.01.1986	skull
182	♀	adult	Toldal, MS	22.03.1987	skull
183	♀	adult	Păingenii, MS	12.01.1986	skull
184	♀	adult	Păingenii, MS	12.01.1986	skull
185	♂	adult	Toldal, MS	22.03.1987	skull
186	♂	adult	Glodeni, MS	29.12.1985	skull
187	♂	adult	Ercea, MS	01.12.1985	skull
188	♀	adult	Ercea, MS	01.12.1985	skull
189	♂	adult	Toldal, MS	01.12.1985	skull
190	♀	adult	Toldal, MS	10.02.1985	skull
191	♀	adult	Ercea, MS	01.12.1985	skull
192	♀	adult	Ercea, MS	01.12.1985	skull
193	♀	adult	Toldal, MS	17.11.1985	skull
194	♂	adult	Toldal, MS	10.11.1985	skull
195	♀	adult	Glodeni, MS	02.03.1986	skull
207	♀	adult	Toldal, MS	11.12.1988	skull
218	♀	adult	Păingenii, MS	09.02.1991	skull
219	♀	adult	Sânișor, MS	27.12.1990	skull
220	♀	adult	Toldal, MS	25.11.1990	skull
221	♂	adult	Toldal, MS	10.12.1989	skull
222	♂	adult	Șicasău (Zetea), HR	01.1990	skull
223	♂	adult	Săbed, MS	06.01.1990	skull
224	♂	adult	Sânărtinu de Câmpie, MS	17.02.1996	skull
225	♂	adult	Săbed, MS	06.01.1996	skull
226	♂	adult	Sânărtinu de Câmpie, MS	17.12.1995	skull
227	♀	adult	Sânărtinu de Câmpie, MS	17.12.1995	skull
228	♂	adult	Săbed, MS	02.01.1996	skull
229	♂	adult	Bozed, MS	09.12.1995	skull
230	♂	adult	Crăiești, MS	17.02.1996	skull
231	♂	adult	Râciu, MS	10.02.1995	skull
232	♂	adult	Bozed, MS	08.01.1995	skull
233	♀	adult	Sânărtinu de Câmpie, MS	10.12.1994	skull
234	♀	adult	Crăiești, MS	08.01.1995	skull

235	♂	adult	Sânărtinu de Câmpie, MS	08.12.1996	skull
236	♂	adult	Râciu, MS	15.12.1996	skull
237	♀	adult	Sânărtinu de Câmpie, MS	08.12.1996	skull
238	♀	adult	Sânărtinu de Câmpie, MS	08.12.1996	skull
239	♀	adult	Crăiești, MS	08.12.1996	skull
240	♀	adult	Sânărtinu de Câmpie, MS	08.12.1996	skull
241	♀	adult	Sânărtinu de Câmpie, MS	08.12.1996	skull
246	♀	adult	Sânărtinu de Câmpie, MS	29.12.1996	skull
247	♀	adult	Sânărtinu de Câmpie, MS	29.12.1996	skull
248	♂	adult	Sânărtinu de Câmpie, MS	29.12.1996	skull
249	♀	adult	Sânărtinu de Câmpie, MS	29.12.1996	skull
250	♀	adult	Glodeni, MS	01.11.1996	skull
251	♀	adult	Săbed, MS	06.01.1997	skull
252	♀	adult	Crăiești, MS	09.02.1997	skull
253	♂	adult	Râciu, MS	16.02.1997	skull
254	♀	adult	Săbed, MS	12.12.1998	skull
255	♂	adult	Săbed, MS	12.12.1998	skull
256	♂	adult	Crăiești, MS	30.01.1999	skull
257	♀	adult	Crăiești, MS	28.11.1998	skull
258	♀	adult	Bozed, MS	19.12.1998	skull
259	♂	adult	Bozed, MS	19.12.1998	skull
260	♂	adult	Săbed, MS	19.12.1998	skull
261	♂	adult	Râciu, MS	30.01.1999	skull
262	♂	adult	Râciu, MS	09.01.1999	skull
263	♀	adult	Bozed, MS	19.12.1998	skull
264	♂	adult	Sânărtinu de Câmpie, MS	30.01.1999	skull
265	♂	adult	Crăiești, MS	28.11.1998	skull
266	♂	adult	Bozed, MS	06.02.1999	skull
267	♂	adult	Săbed, MS	06.02.1999	skull
268	♂	adult	Bozed, MS	06.02.1999	skull
269	♀	adult	Bozed, MS	06.02.1999	skull
270	♂	adult	Râciu, MS	06.12.1997	skull
271	♀	adult	Bozed, MS	20.12.1997	skull
272	♂	adult	Nima Răciului, MS	23.02.1997	skull
273	♀	adult	Crăiești, MS	03.01.1998	skull

274	♂	adult	Nima Râciului, MS	20.12.1997	skull
275	♂	adult	Bozed, MS	07.02.1998	skull
276	♂	adult	Crăiești, MS	27.11.1999	skull
277	♂	adult	Săbed, MS	25.12.1999	skull
278	♂	adult	Râciu, MS	12.12.1999	skull
279	♂	adult	Nima Râciului, MS	18.12.1999	skull
280	♂	adult	Râciu, MS	12.12.1999	skull
281	♂	adult	Râciu, MS	09.01.2000	skull
282	♂	adult	Sânmartinu de Câmpie, MS	10.02.2001	skull
283	♀	adult	Nima Râciului, MS	17.02.2001	skull
284	♂	adult	Nima Râciului, MS	17.02.2001	skull
286	♀	adult	Crăiești, MS	20.01.2002	skull
287	♂	adult	Crăiești, MS	20.01.2002	skull
288	♀	adult	Săbed, MS	02.02.2002	skull
289	♂	adult	Săbed, MS	02.02.2002	skull
290	♀	adult	Săbed, MS	09.02.2002	skull
291	♀	adult	Bozed, MS	09.02.2002	skull
292	♂	adult	Crăiești, MS	16.02.2002	skull
293	♀	adult	Sânmartinu de Câmpie, MS	16.02.2002	skull
294	♂	adult	Sânmartinu de Câmpie, MS	16.02.2002	skull
295	♂	adult	Sânmartinu de Câmpie, MS	16.02.2002	skull
296	♂	adult	Nima Râciului, MS	03.02.2002	skull
297	♂	adult	Bozed, MS	23.02.2002	skull
298	♂	adult	Bozed, MS	23.02.2002	skull
299	♀	adult	Săbed, MS	23.02.2002	skull
301	♂	adult	Râciu, MS	08.12.2002	skull
302	♂	adult	Râciu, MS	08.12.2002	skull
303	♂	adult	Sânmartinu de Câmpie, MS	08.12.2002	skull
304	♂	adult	Râciu, MS	08.12.2002	skull
305	♂	adult	Săbed, MS	28.12.2002	skull
306	♂	adult	Bozed, MS	28.12.2002	skull
307	♂	adult	Băla, MS	28.12.2002	skull
308	♂	adult	Râciu, MS	12.01.2003	skull
309	♂	adult	Crăiești, MS	04.01.2003	skull

331	♂	adult	Bozed, MS	26.01.2003	naturalized
332	♂	adult	Bozed, MS	26.01.2003	skull
333	♀	adult	Glodeni, MS	27.01.2003	skull
334	♂	adult	Băla, MS	01.02.2003	skull
335	♂	adult	Crăiești, MS	15.02.2003	skull
336	♂	adult	Sânărtinu de Câmpie, MS	15.02.2003	skull
337	♀	adult	Bozed, MS	22.02.2003	skull
338	♂	adult	Nima Râciului, MS	22.02.2003	skull
339	♀	adult	Bozed, MS	22.02.2003	skull
346	♂	adult	Râciu, MS	13.12.2003	skull
347	♂	adult	Râciu, MS	13.12.2003	skull
348	♂	adult	Râciu, MS	13.12.2003	skull
349	♂	adult	Râciu, MS	13.12.2003	skull
350	♂	adult	Crăiești, MS	03.01.2004	skull
351	♂	adult	Crăiești, MS	03.01.2004	skull
352	♂	adult	Crăiești, MS	03.01.2004	skull
353	♂	adult	Crăiești, MS	03.01.2004	skull
354	♀	adult	Crăiești, MS	03.01.2004	skull
355	♂	adult	Crăiești, MS	12.03.2005	skull
359	?	adult	București, IF	1955–1957	naturalized
378	♀	adult	Poarta, MS	22.01.1989	skull

Family Felidae

Felis silvestris Schreber, 1775

197	♀	adult	Răstolița, Ms	08.04.1984	skin and skull
330	♀	adult	Fântânele, MS	16.02.1999	carpet
375	?	adult	Târgu-Mureș, MS	10.02.1963	skull

Subfamily Pantherinae

Panthera leo Linnaeus, 1758

204	♂	adult	Târgu-Mureș, MS	01.12.1987	skin and skull
212	♀	adult	Târgu-Mureș, MS	1990	skin and skull

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Family Suidae

Sus scrofa Linnaeus, 1758

93	♂	juvenile	Culpiu, MS	02.01.1984	skull
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110	♀	adult	București, IF	(ante)1958	naturalized
243	♀	adult	Bozed, MS	23.10.1993	skull
244	♀	adult	Lunca Bradului, MS	12.1990	skull
319	♂	adult	Câmpu Cetății, MS	25.10.1962	fangs
320	♂	adult	Câmpu Cetății, MS	30.01.1972	fangs
321	♂	adult	Bistra Mureșului, MS	05.10.1967	fangs
322	♂	adult	Eremitu, MS	15.02.1963	fangs
323	♂	adult	Rigmani, MS	11.01.1991	fangs
324	♂	adult	Gălățeni, MS	18.12.1988	fangs
325	♂	adult	Nadeș, MS	25.02.1973	fangs
326	♂	adult	Săcădat (v.Iszulyka) MS	10.12.1964	fangs
327	♂	immature	Vadu (Vărgata), MS	05.10.1967	fangs
377	♀	juvenile	Sânmartinu de Câmpie, MS	22.01.1997	skull

Family Cervidae*Cervus elaphus* Linnaeus, 1758

211	♂	adult	Glodeni, MS	20.10.1989	trophy
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Family Capreolidae*Capreolus capreolus* Linnaeus, 1758, (total 18 pieces out of them 4 pieces are naturalized)

97	♀	juv.	Târgu-Mureș, MS	13.08.1975	naturalized
98	♂	juv.	Târgu-Mureș, MS	01.08.1975	naturalized
100	♀	adult	Budiu Mic, MS	12.10.1977	naturalized
109	♂	adult	Budiu Mic, MS	1977	naturalized
142	♂	adult	Corunca, MS	19.03.1988	trophy
147	♂	adult	Giuluş (Ogra) MS	19.09.1982	trophy
148	♂	adult	Toldal, MS	1980	trophy
150	♂	adult	Săbed, MS	06.07.1976	trophy
151	♂	adult	Țigmandru (Nadeș) MS	03.09.1976	trophy
152	♂	adult	jud. MS	(ante)1989	trophy
208	♂	adult	Târgu-Mureș, MS	12.02.1980	trophy
310	♂	adult	Șincai, MS	29.07.1968	trophy
311	♂	adult	Șincai, MS	05.08.1977	trophy
312	♂	adult	Bozed, MS	29.07.1970	trophy
313	♂	adult	Ozd, MS	25.08.1975	trophy
314	♂	adult	Fânațele Mădărașului, MS	20.07.1971	trophy

315	♂	adult	Săbed, MS	15.07.1985	naturalized head
328	♂	adult	Suveica, MS	03.08.1979	trophy

Family Bovidae

Rupicapra rupicapra Linnaeus, 1758

316	♂	adult	Mt. Făgăraş (Caprei), SB	11.11.1971	trophy
317	♂	adult	Mt. Făgăraş (Caprei), SB	14.11.1968	trophy
318	♂	adult	Mt. Retezat (Morii), HD	10.11.1972	trophy
329	♀	adult	Mt. Făgăraş, SB	10.11.1970	trophy

Ovis ammon Linnaeus, 1758

94	♀	adult	Târgu-Mureş, MS	26.08.1975	naturalized
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Ammotragus lervia Pall., 1777

95	♂	adult	Târgu-Mureş, MS	04.10.1975	naturalized
96	♂	juvenile	Târgu-Mureş, MS	28.08.1975	naturalized

Conclusions

The museum collection of mammals comprise a total of 378 pieces of mammals, representing 32 species. This is composed by 36 naturalized pieces, 27 trophies, 296 animal skulls and two fur carpets, 16 skins, one head naturalized. The main exhibit includes 26 pieces naturalized, 16 skulls and the stark gold medalist trophy from Glodeni.

Aknowledgments

We want to thank the hunters and collaborators who have contributed to enriching this collection, to Mr. Zsolt Hegyeli to verify rodents and insectivores and to dr. Mihaela Sămărghiţan to help me with the translation of this paper.

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**CATALOGUL COLECȚIEI DE MAMIFERE A MUZEULUI
JUDEȚEAN MUREȘ, SECȚIA DE ȘTIINȚELE NATURII
(Rezumat)**

Colecția de mamifere a Muzeului Județean Mureș a fost constituită în perioada 1958–2014. Neexistând un taxidermist, primele exemplare naturalizate au fost achiziționate. În anul 1967, subsemnatul a fost angajat pe acest post. Marea majoritate a pieselor au ajuns la muzeu ca animale împușcate, accidentate sau capturate de alții, dar recuperate de către personalul muzeului și de către vânătorii colaboratori (muzeograful Sárkány K. Andrei, șeful de secție Kónya István, maistrul vânător Szombath Ștefan și alții). Momentan, colecția de mamifere este compusă din 36 de piese naturalizate, 27 de trofee, 296 de cranii de animale, 2 blănuri tip covor, 16 piei, 1 cap naturalizat, totalizând 378 de piese, respectiv 32 de specii. Dintre acestea, sunt expuse în expoziția de bază 26 de piese naturalizate, 16 cranii și trofeul de cerb de la Glodeni, medaliat cu aur.



Fig. 1: *Ammotragus lervia* Pall. 1777 (inv. no. 96)



Fig. 2: Muskrat skulls (*Ondatra zibethicus* Linnaeus, 1766)



Fig. 3: Fox skulls (*Vulpes vulpes* Linnaeus, 1758)



Fig. 4: Bear skulls (*Ursus arctos* Linnaeus, 1758) (inv. no. 149)



Fig. 5: Wild boar (*Sus scrofa* Linnaeus, 1758) purchased from AGVPS Bucharest (inv. no. 110)



Fig. 6: Badger (*Meles meles* Linnaeus, 1758) purchased from AGVPS Bucharest (inv. no. 111)



Fig. 7: Wolf (*Canis lupus*, Linnaeus, 1758) and deer (*Capreolus capreolus* Linnaeus, 1758) (collected by hunters and naturalized at the museum, inv. no. 107, 109)



Fig. 8: Fat dormouse (*Myoxus glis* Linnaeus, 1766) (trap caught, donated, prepared at the museum inv. no.105)



Fig. 9: Deers (*Capreolus capreolus* Linnaeus, 1758) in Plain Ecosystem (naturalized pieces belonging to museum's collection; inv. no. 97, 100)



Fig. 10: Mountain Ecosystem (naturalized pieces belonging to museum's collection; inv. no. 111, 112)

ISSN 1016-9652